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VISITORS to the Challenge of the Chip exhibition at the Science Museum, London, now in its sixth week, could be forgiven for assuming that a new theme had been chosen for the show, quite different from that advertised — namely, the fallibility of computers. A feature of the show when it opened (CW, March 6) was the large number of hands-on exhibits provided for visitors to try; sadly, a large number of these are now not working.

Games, special purpose control equipment, personal computers, and other equipment in large numbers are either dead, or displaying "out of action" signs, or are absent, leaving gaping holes in the walls.

Other displays, such as a micro-controlled air conditioning system or an electronic metronome, respond when their buttons are pressed but in no predictable fashion. An electronic colour-coded tune-playing game merrily makes music in its own way irrespective of how visitors twiddle its knobs.

If an exhibition were intended to reassure people that computers are far from being omnipotent monsters that are about to take over the world, it could hardly be better arranged.

As for presenting a realistic picture of the world, the show scores top marks. A micro-controlled train set emulates British Rail admirably, by having only one out of four trains running. Post Office operators are cunningly aped by a telephone answering machine that steadfastly refused to answer the telephone.

Meanwhile staff are pressing ahead with repairs, both to the machines and the image of our Electronic Future.

And the educational value of the show? One young lady, a graduate, attentively watched Intel's film on bubble memories, twice through. After this she remarked: "I didn't understand one word of it."

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NEWS IN BRIEF

DoI to set up own viewdata

THE Department of Industry is to set up an inhouse viewdata system which it is to develop itself. Plans so far are for a pilot system to be running by the autumn on a DoI mainframes with between 30 and 40 small business-type terminals, probably with colour displays, and could access Prestel.

Applications are likely to include messages between individuals or buildings and functions involving the continual updating or recording of information.

Printing service

CMG has launched a printing service based on a Honeywell Page Printing System installed at its Croydon bureau. The aim is to help computer users to cope with peak loading without an excessive investment in printers.

Quick deliveries

SOME US customers with several 4341s on order are saying that IBM is pressing them to take delivery of second and third machines ahead of schedule. In the UK, however, IBM is still quoting delivery in about 20 months for users placing orders now.

Joint venture

A JOINT venture has been set up by Olivetti and Memorex to establish a plant in Italy to make drives for 8-inch discs. Memorex has formed a subsidiary to provide 40% of the capital with the remainder coming from Olivetti. It is planned to be in production by the end of the year.

IBM look-alike after Cambridge deal

LATEST entrant to the IBM compatible systems market in the UK is Peripherals Computers Memories and Leasing of Cobham, Surrey. PCML is finalising an agreement with Cambridge Memories of Massachusetts under which it will sell IBM compatible Cambridge processors as part of complete end user systems. PCML will get its peripherals from suppliers like Storage Technology.

Meanwhile California firm Two Pi, a small subsidiary of Philips, is understood to be finalising an agreement to supply its IBM compatible V32 minicomputer to Nixdorf on an OEM basis. Nixdorf is expected to exhibit the V32 at the Hanover Fair later this month.

Nixdorf was not prepared to comment on the deal but a Two Pi spokesman in California simply confirmed that extensive discussions had been held with Nixdorf. He added that Two Pi was also talking to Xerox in the US about an OEM agreement.

Joseph Cruy, boss of Cambridge Memories, told Computer Weekly that the agreement with PCML had not yet been signed, adding that PCML was free to offer systems based on Cambridge processors to prospective customers.

One Cambridge machine, the 1640, roughly matches the IBM 370/148 in performance and was first exhibited in Europe at the Systems 79 show in Munich by Digital Computer Peripherie of Frankfurt, which is selling the 1640 as part of complete end user systems (CW, September 27, 1979).

While the Cambridge machines are intended as direct replacements for medium scale IBM mainframe processors, the V32 from Two Pi is aimed at big end users or computer services companies looking for a low cost IBM compatible machine to run dedicated applications or systems software.

National CSS, the big time sharing company, was the first significant OEM customer for the V32 in the US and offers the machine as part of an end user system called the 3200. Its most important feature is VPS, a version of VPCSS the powerful time sharing operating system that forms the basis of the CSS time sharing service.

NEB backing will help firm catch up orders

BACKING from the NEB for Technologics of Liverpool, (CW, January 31) means the three-man firm will be able to expand and catch up with the backlog of orders for its TECS Prestel-compatible microcomputer.

The backing takes the form of setting up Technologics Computing which is jointly owned by Technologics, the NEB and Sepling Enterprise.

Sepling is also a new company set up last year by the NEB with Collinson Grant, a Manchester-based consultancy, to provide management skills to small companies to help them grow.

Sepling now owns 11,000 £1 shares in Technologics Computing while Technologics and the NEB own 4,000 each, with the NEB holding a further 40,000 redeemable preference shares.

Rigby Electronics is now making TECS in Manchester. Rigby is an earlier protege of Sepling Enterprise. This has brought the quoted delivery time down to about four to six weeks from "indeterminate" while the firms three founders were struggling to handbuild them themselves.

Meanwhile the system, which was first announced over two years ago, has undergone many changes. Microsoft Basic has been imported from the US along with the Flex disc operating system written by Technical Systems Consultants.

The primary product is now a £2,900 editing terminal with twin 5 inch floppy discs and 18 kilobytes of RAM. With two 8 inch floppies it costs £3,400.

It has both an internal modem and a V24 interface for connection to an external modem and is being developed to provide a local viewdata database for a small number of terminals.

The three founders — Andrew Polkowski, Laurence Cook and Mike Siddles — were all electronics engineers from Plessey.

Burroughs wins $32m Nato net contract

BURROUGHS has won a $32 million contract from Nato to supply message switching computers for Scars-2. This is a network that will enable real time data to be transmitted between local Nato units and Supreme Headquarters Allied Powers in Europe, Shape.

Scars, (status control alerting and reporting system) is one of several major Nato communications projects providing big business for the DP Industry.

Another project involving a big command and control network called ACE-CCIS, has provided an international consortium that includes Logica with an $8 million study contract (CW, January 10).

In addition to Scars, another large scale message switching network called Camps (computer assisted message processing system) is being set up specifically for handling telegram messages between Nato member countries. The contract, worth more than $25 million for equipping Camps with switching computers, went to Danish electronics firm Christian Rovsing (CW, January 17) who bid against Burroughs for the Scars contract. The contracts for Scars and Camps have both been expected for two years (CW, May 18, 1978).

The message switching computers being supplied for Scars are defence versions of the new Burroughs communications processors, the CP 9400 and 9500 (CW, January 24).

Schools' Prestel micro plan

THE development of a telesoftware capability for microcomputers in schools planned by the Council for Educational Technology (CW, November 15, 1979) has begun in earnest now that the council has taken delivery of its Research Machines 380Z and entered into a joint development agreement with the company.

The council already runs an umbrella information provider service on Prestel for which pages are submitted by nine sub-information providers in education and its editor Mike Brown is writing a program in Z80 assembly language to turn a 380Z into a viewdata terminal capable of loading telesoftware from Prestel or small databases in schools. He has already written a program to maintain and use a viewdata database on a 380Z.

The software is expected to be available from Research Machines by August in time for the next academic year and to sell for £30. Users should then be able to load the database maintenance program from the council's Prestel database.

Leasing hit

● From front page

folio of railcars. Itel reported a loss of $175 million in the third quarter of 1979 and has published no accounts since.

In another development involving the US leasing industry the New York based lessor, OPM, which also has offices in London, Paris and Cologne, has been fined $110,000 for banking offences of a criminal nature. Under the plea bargaining procedures used widely in US courts, OPM lawyers decided to plead guilty in return for charges against OPM executives being dropped.

OPM pleaded guilty to writing cheques for which no funds were available at the time in a bank at Gretna, Louisiana, called the First National Bank of Jefferson Parish. The bank is now majority owned by OPM.

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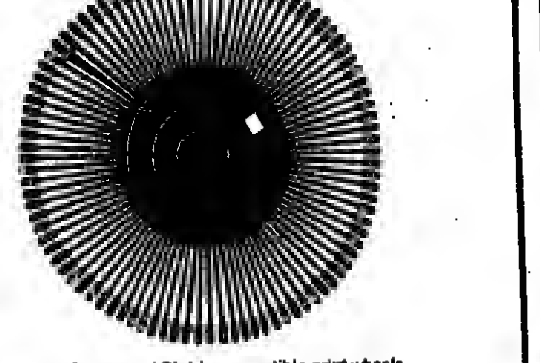

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Briefing

IBM price cuts herald new WP

PRICES of IBM's System 6 word processor range have been reduced by around 20%, giving for example a new price of £13,563 for the Model 6440 with ink jet printer and floppy disc. The cuts are being taken to indicate the imminent introduction of a new WP product to replace the unsuccessful System 6, probably to be made by General Systems Division for sale by Office Products Division.

NRDC backs SID

THE government-funded National Research Development Corporation is backing development and sales of systems house SPL's SID-Plus enhancement package for users of the General Automation SID interface device for connecting banks to the Swift interbank funds transfer network. A prototype of SID-Plus has been running at three Norwegian banks for four years (CW, August 5, 1976).

Peripherals 80

PERIPHERALS from over 40 suppliers will be on show next Wednesday and Thursday, April 16 and 17, at the Peripherals 80 exhibition at London's West Centre Hotel, Lillie Road.

Details: page 17.

Troubled issue

WE apologise to readers and advertisers for the absence of some regular features and for the reduced news coverage for the second week running in Computer Weekly. The problem was caused by circumstances beyond our control.

Apex takes tougher line on technology

WHITE-COLLAR union Apex is to fight for a four-day, 30-hour working week and more comprehensive training and retraining schemes for its members. It will also refuse to co-operate with any company which plans to introduce new technology without first signing an Apex technology agreement.

A technology agreement stipulates not only the way in which computers and associated equipment should be introduced into a company but also the minimum job conditions and benefits that will result from the changes.

And in line with the above proposals, the European Communities Commission has identified the need for more extensive information on new technology, greatly enhanced training facilities for workers and better consultation and planning at the place of work.

The Apex strategy is outlined in the union's latest report, entitled Automation and the Office Worker. It is the second report on technology in the office environment, the first being Office Technology — the Trade Union Response, which was published last year (CW, March 22, 1979).

A description of the types of equipment that office workers can expect to be using in the near future is given, as is an analysis of how Apex sees such technology affecting employment levels.

While it feels that nothing it does can replace government or EEC intervention, Apex makes it quite clear that it intends to inform its members as best it can by continuing to run two-day, three-day and one-week intensive training courses for staff representatives.

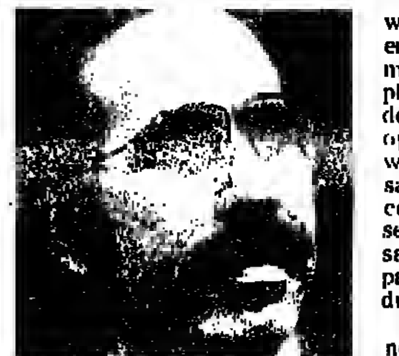
Dealing with the predicted changes in its own way, the European Communities Commission has said that it is preparing a summary of the training requirements for new technology based on data provided by the EEC Consultative Committee on Vocational Training and is setting up a team to co-ordinate and analyse information produced on the subject.

Big threat to IBM as rivals team up

IBM faces the most serious potential threat ever to its base of large-scale mainframe sites following the plan by IBM-compatible equipment manufacturers Amdahl and Storage Technology to merge. Amdahl has been bidding to expand in the IBM market for some time but a planned link-up with Memorex fell through last year (CW, November 22, 1979).

The combined turnover of processor manufacturer Amdahl and peripherals supplier Storage Technology in 1979 was about $800 million and the two firms are growing more rapidly in real terms than most companies in the mainframe market even though they are both going through bad times.

The letter of intent signed by Amdahl and Storage Technology last week outlined terms which would give their respective shareholders almost exactly 50% of the new company even though Storage Technology's turnover is about 60% higher and its overall stock value marginally greater.



JESSE AWEIDA: Merger by July ...

Jesse Aweida, chairman of Storage Technology, is to get the top position in the new company as chairman and chief executive, while Amdahl chairman Gene White has been lined up as deputy chairman. The president and chief operating officer will be the existing Amdahl chairman, John Lewis.

Aweida told Computer Weekly that a definitive agreement would probably be signed by the end of this month and that the merger would probably be completed by July. Asked about the degree to which the marketing operations of the two firms would be integrated, Aweida said that the establishment of combined sales offices made sense but he was not sure about sales people from both companies selling the complete product range.

Aweida pointed out that the new company would be given a "very descriptive" new name.

Asked by Computer Weekly why the negotiations with Storage Technology were more likely to be successfully completed than Amdahl's talks with Memorex, Gene White at Amdahl commented that there was a "fundamental agreement" between the boards of Amdahl and Storage Technology. He added that the shareholders of Storage Technology were "a lot happier" about the merger than Memorex shareholders had been.

However, the value of Storage Technology shares closed 50 cents down at $13.875 on March 31, the day the merger was announced, while Amdahl shares closed 87.5 cents up at $19.25. There are 24.8 million Storage Technology shares outstanding and each stockholder will get three-quarters of a share in the new company for each share held in Storage Technology. Holders of Amdahl's 18.8 million shares will receive the same number of shares.

GENE WHITE: Fundamental agreement ...

CDC in UK micro initiative

FOUNDER of Control Data, William Norris, has put forward proposals for a British consortium to set up a micro manufacturing operation. This comes as Inmos, the National Enterprise Board's microprocessor venture, still waits to hear if the government is going to provide the promised second £25 million.

However, GEC has now expressed an interest in Inmos and may relieve the government of the need to put any further money into the venture.

Norris was in the UK over Easter to talk on high technology in education at a convention organised by the Co-operative Union in Torquay. He took the opportunity to raise the consortium idea and talked with ICL, as a manufacturer, and Shell and Pilkington, the glass makers, as potentially big users.

Norris said he was not interested in taking a share in Inmos because he did not consider the project was big enough. Such a venture needed at least £75 million to get off the ground and then continued big investment. He was concerned about his company's access to micro components, especially high-speed devices, and, possibly as a customer, he did not think that Inmos would be in operation soon enough.

ICL said that if it did get involved in a UK micro project it would most likely be in the test and design area, in which it already had some capacity.

GEC's interest in taking a share in Inmos is thought to be because of doubts about its joint venture with Fairchild, which has been at a virtual standstill since Fairchild was taken over by Schlumberger last May.

Plato in the home

CONTROL Data is to start installing its Plato computer-based education terminals in homes in the US, while in the UK it is to introduce a new Plato course called Excel.

The US home Plato system is to be called Homework and it is initially intended to retrain medically-disabled people. Homework is to be a profit-making service and its was developed from an internal CDC training programme in which 10 disabled employees were retrained in their homes.

It is likely that the Plato-in-the-home idea will be extended to non-disabled users in the near future.

To be offered to UK users of Plato in June, when learning centres in Bristol, London, Manchester and Birmingham will open, the Excel course will help staff identify areas of their work in which they need development. Topics include "communicating successfully", "criticism and job responsibilities", and "understanding and thinking about one's own career goals".

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COMPUTERVIEW

A merger to be welcomed

IBM USERS should be fervently hoping that the talks announced last week between Amdahl and Storage Technology will come to fruition.

If the merger does go ahead the combined company, equally owned by the present stockholders of each company, will be in a strong position to "keep IBM honest".

Put together, Amdahl and Storage Technology form a company with an annual turnover which should reach $1,000 million by the end of the year. That will put it just behind Siemens in terms of annual business done, but it should soon be challenging ICL, CII-Honeywell Bull and Fujitsu for their joint sixth place in the world general-purpose mainframe league.

Much more important, it will be able to offer IBM users an alternative to the full line of 303X and forthcoming H-series mainframes, to the 3370, 3350 and forthcoming Whitney disc drives, to the 3880 disc controller and the 8809 tape drive.

Formation would leave IBM with a nasty dilemma. The IBM approach has been to introduce a new generation with subtly altered operating software, charged for where the previous version was free, and then only provide support for exciting new peripherals in the operating system announced with the new equipment.

That is splendid for IBM, but not much fun for the user, since he has to go through a significant conversion of all his software to the new standard. That was all right in the 1960s and early 1970s when all manufacturers were making their users jump through the same hoop. Since then, users have become much more canny, and by continuing with that approach, IBM is putting itself more and more out on a limb.

What, therefore, should IBM do in the H-series? If it introduces a major superset of MVS which involves significant conversion, it will make it difficult and expensive for the new Amdahl-Storage Technology to maintain full compatibility. But the principal reason why users follow IBM up hill and down dale is fear that they will be shut out from all the latest peripherals.

But the world has changed radically since 1975. Conversions are now so expensive and disruptive that for many users the attractions of the next generation product counterparts to the 3800 laser printer and the 3850 mass storage system are outweighed by the disadvantages of conversion.

The industry, too, is fully capable of matching almost any new IBM product within 18 months and Siemens' second generation laser printer, for example, is already being talked of where few observers have yet spotted a 3800 replacement in IBM's immediate future.

The majority of IBM users will follow slavishly, whatever the company dictates. But increasing numbers of users will find the Amdahl-Storage Technology alternative extremely seductive if IBM tries to erect too many barriers against the new company.

If, on the other hand, IBM maintains full compatibility, the development costs of the new company will be lower, and it will find it easier to compete with IBM on price.

IBM is thus faced with deciding which is the lesser of two evils; either way the discerning user comes out the victor.

LETTERS to the EDITOR

Confidentiality—it's time to avoid the hysteria

FOR some time the BMA has been making noises to its members to warn them of Area Health Authorities' plans to set up computerised medical records schemes and to advise that no co-operation should be given before safeguards to patients' confidentiality have been formally agreed with the medical profession.

What a priceless example of cant. Is it certain that all surgeries are secure? In one Health Centre at least patients' records, in the familiar little packets (some full to overflowing), are kept on a number of large roundabouts fitted with library shelves. These are open to all staff in the centre including, of necessity, cleaners.

For years doctors' surgeries have been staffed with a variety of personnel recruited locally and for whom curiosity about their neighbours' secret ills must present many temptations. They do not sign an Official Secrets Act declaration! Confidentiality in these circumstances is only as good as the doctors' handwriting is bad.

Paper records are, by their very nature, insecure. The security chiefs in any industry or government department reflect ruefully on how difficult it is for them to persuade staff to keep within security rules, even where top-level trade and national defence secrets may be put at risk. In offices up and down the country supposedly confidential records are left lying on desks, in open drawers, in unlocked filing cabinets and piled in corners. Any really interested party can obtain the information he wants so long as he can obtain access to the area where it is stored.

Contrast this with electronically-stored information which cannot readily be read or photographed. If access is to be gained it is by formally requested printout or terminal, all of which can be carefully controlled and, more important, switched off after hours when there is no one in the offices in which the access points are located. Also, instead of having custodians close to the source of information and who may have an interest, they are maintained by computer operators who are likely to be much more remote and uninvolved. What is more, if they attempt to obtain information from the files this will be logged and detectable by the management.

It is also possible for proliferation of records to be eliminated by storing information centrally (or regionally). In this way only those who needed to know would be given access to the information banks and, to take again the medical example, the doctor could write up consultation notes straight to patients' records with no intermediate stage of sorting and filing by clerks or receptionists.

Thus before we get carried too far down the road to hysteria let us accept that paper records leave much to be desired in security terms and that centralised electronic data stores are much more secure. The real problem is control of access to really sensitive information (there is not so much of it) and it is to this we should specifically address ourselves.

If we do this conscientiously, we must conclude that electronic storage in computer databanks, which are usually kept in rooms to which access is strictly limited and protected by sophisticated locking devices, must be better than any form of hard copy. Security and confidentiality are only as good as the staff responsible for maintaining them; however, computers do make unauthorised access much more difficult.

GEORGE LAWS
Deputy Borough Treasurer
Trafford Metropolitan Borough Council.

Balance in UKITO

YOUR Computerview (March 27) welcomed the foundation of UKITO but questioned the wisdom of our having as a member ICL with its dominant size and past record of government support.

There is no doubt that in the past the government has paid more attention to ICL than to the rest of the truly British information technology industry. Indeed, Dr Wilson, ICL's managing director, has himself recently expressed this view.

Now, with the British companies working more closely together we are seeking a more equitable balance. Cries of outrage from US companies in the UK on the formation of UKITO suggest to us that we must be on the right lines.

Certainly ICL is large, but it is also an integral part of the UK industry. In UKITO it has only one voice as does each of the other members.

The right balance can be assured if more and more truly British members of the information technology industry join UKITO. We would welcome them and I would be pleased to hear from any who would like to do so.

M. H. JOHNSON
Chairman, UKITO

THE EDITOR welcomes letters commenting on subjects published in Computer Weekly, or on original topics. All letters must be accompanied by the writer's name and address, not necessarily for publication.

Failure of universities

I AM afraid Professor Pitteway and Dr Race (Letters, March 27) do not encourage me to feel that our universities provide, in the form of computer science graduates, an answer to the shortage of suitable personnel.

We have all but ceased to look to computer science departments to provide suitable talent for the industry. Such graduates tend to feel they know everything there is to know about computing and expect to be offered positions as systems analysts, or senior programmers at least.

In fact, they make the fundamental mistake, encouraged by many universities and polytechnics, of thinking of computing as an end in itself. They are fascinated by the wonders of compiler writing or multiple esoteric languages. What they fail to realise is that computers are only a tool. They have negligible thoughts on the actual application of their theoretical skills and worse still many of them are barely capable of expressing their ideas verbally or in writing.

To say that sandwich students offer a cost-effective alternative to contract programmers is to condemn the organisation of our industry: if a second-year student can replace someone with five or 10 years' experience and maturity, what sort of career prospects are being offered to the graduate? The use of contract staff has been necessitated by the failure of all concerned, including universities and industry, to anticipate and plan for the manpower requirements of this applied science. When will universities realise that the need is for economists, statisticians and the like, who can apply their background knowledge using computers?

Finally, let me hasten to add that my company has indeed taken on some sandwich students and been pleased with results, but sadly I see a steady decline in the quality being offered, which I can only assume represents a lowering of standards of the intake. It makes me wonder where all the "junior" programmers are going to come from in a few years' time.

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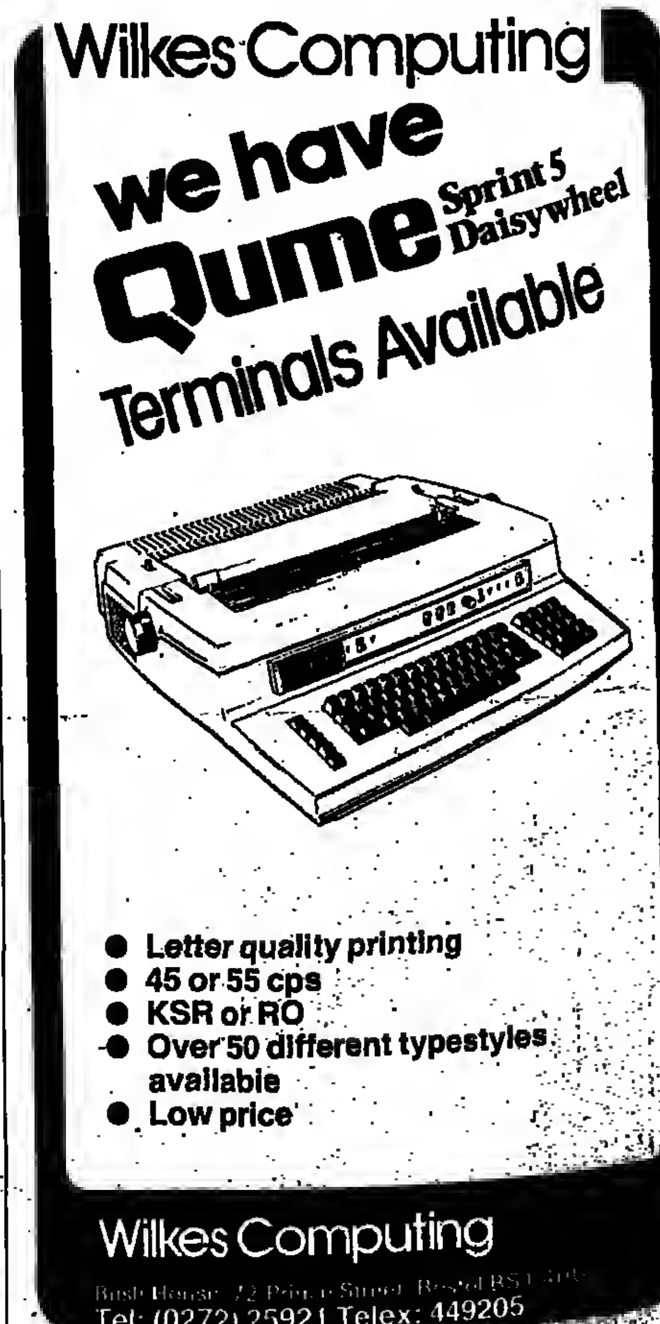

1984 and all that...

THIS week's example of the strange things people say in the media about computers was sent in by P. I. Barker of Norwich, who wins £5.

The charges on the little piece of silica which record the fact that you have £90 in the bank may be changed when hit by a cosmic ray so that the read-out of the computer's memory may say you have only £10. Or the other way round!

Challenge, the Christian newspaper

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Shaking apathy of UK management

BRITISH-management does not appear ready to receive new office technology, even though the technology is already available for its use, according to David Firnberg, head of Urwick Nexos, the training and consultancy firm for office systems (CW, December 6, 1979). To try to rectify this, Urwick Nexos is to launch a series of one-day awareness seminars for managers and their staff.

Starting in May, the seminars will cater separately for board-level management, financial management, personnel officers, and marketing and advertising staff. Case histories will form a major part of the presentations.

Much of the effort in producing the seminars will be contributed by staff from the parent consultancy, Urwick Orr. Urwick Nexos now has two professional staff, Firnberg having been joined by Marco Kopp, who has previously worked on office systems consultancy with Logica and Data Recall.

Urwick Nexos is also to carry out a detailed study of in-house printing and how it ties in with text production. A seminar and a published report are to come out of this. Further state-of-the-art reports and analyses are expected to follow, using both conventional publishing techniques and new ones such as audio cassettes and viewdata.

Firnberg is confident that the firm should be able to give impartial advice on system design and purchasing despite the link with Nexos, a word processing supplier. The Urwick link balances this, he says.

Firnberg

Peter Hooton of Nexos said he hoped Urwick Nexos could dispel many of the misconceptions about word processing which prospective purchasers now have. WP has become fashionable, he said, and discipline needs to be applied.

Sponsors needed for education research

IN an attempt to promote educational applications of small computers, the Microprocessor Educational Research Group, formed in 1978 by lecturers and scientists from Worcester College of Higher Education and the Royal Signals and Radar Establishment at Malvern, has launched a sponsorship appeal.

The group plans to tackle three proposed projects during 1980 and is looking to industry and commerce for financial support. Project One is to examine the use of small computers for administrative purposes in higher education. The second is to establish a national clearing house for information on microcomputers, and the third is to provide a software writing and conversion facility for a range of microcomputers.

Proposals for sponsorship should be directed to Brian Whalley at Worcester College of Higher Education on Worcester 422131.

Zygal may acquire Telefile offshoots

TALKS are under way which could lead to the UK and German subsidiaries of Telefile, the Irvine, California computer and peripherals manufacturer, becoming British-owned.

Telefile has reached agreement with its principal lender, First National Bank of Chicago, for a debt restructuring involving repayments between September 1980 and September 1981 of $4,745,000 of the $7.9 million owed to the bank. If the payments are made on time, the balance owed will be returned to Telefile, as will $3 million of Telefile preferred stock, and other rights will be relinquished.

In order to raise the money, Telefile plans to sell some assets, notably its UK and German subsidiaries, and its minicomputer products division, which makes a universal disc controller enabling various disc drives to be linked to a wide range of OEM minis.

Zygal Dynamics, formed by Con Driscoll and John McLean at the same time as they set up the UK subsidiary of Telefile, is negotiating with Telefile to buy the two European subsidiaries. Zygal does annual business of £1.3 million, mostly in Diablo terminals and printers, while Telefile's European businesses total about £1.5 million a year.

Zygal also markets a Zentek intelligent terminal which includes an Intel 8080A processor, a half-megabyte on floppy discs, full screen and keyboard, with the Micro Focus CIS-Cobol compiler.

Telefile's principal businesses are selling add-on memory and peripherals and providing maintenance for Xerox Sigma mainframe users. It hopes to have its T-85 processor, an AMD 2901 bit-slice micro emulation of the Xerox Sigma 9, ready for shipment this summer. It plans to offer the T-85 with the Xerox CP-V operating system both to existing Sigma users and to new customers.

Previously handled by third party companies, Zygal products are to be maintained by a new company, Zygal Services.

Trend for UK to import assembled boards

A MOVEMENT towards the importing of ready-assembled microelectronic boards rather than individual components and printed circuit boards (CW, October 18, 1979) has been confirmed in the annual report of the Electronics Components Industry Federation.

EEC policy rules that duty payable on imported components is around 18%, while on assembled computer-boards it is only around 6%. With the cost of testing these boards and freight costs it is economic sense to import the ready-assembled boards.

A second trend indicated by the results of the study was a hardening of prices for the leading-edge products during 1979 as rising world demand produced a world shortage.

An increasing awareness of microelectronics in UK industry is apparent, and the UK market for integrated circuits is expected to grow despite the onset of recession. Last year, it rose 24% to reach £168 million, while in other areas of the semiconductor industry it grew by 9% to £113 million.

Semiconductor manufacture in the UK increased at the same rate as the market, along with the net trade deficit, which grew from £59 million to £72 million for the industry as a whole.

Cross-border data controls

GOVERNMENTS should beware of trying to impose controls on the cross-border flow of non-personal data because of the danger of serious economic effects of such controls. That is the view of the International Chamber of Commerce, based in Paris, which claims that more study of the subject is needed.

Regarding personal data, the ICC has decided that an international agreement on data flow is necessary, and calls for implementation of the draft guidelines drawn up by the Organisation for Economic Co-operation and Development. These are more flexible than those from the Council of Europe and the EEC and do not involve tiers of "bureaucratic impediments to trade," the chamber says.

Downtime

by Chad

Blinkin' bad show, what...

WE scribblers are of course overworked and underpaid, but the job has some compensations. Occasionally we are given little presents by the firms we write about, presumably in gratitude for having sat through tedious presentations without complaining too much.

Now don't get your noses a-quivering, or start thinking there's another bribes scandal on the way! We don't let these gifts colour our judgment in the teeniest way over what we write. But come to think of it, maybe we might.

A while back everyone on the paper got given little pocket calculators by a certain computer company. Already both mine and my colleague Tim Palmer's are on the blink. I mean literally — in the middle of important calculations the displays blink on and off in haphazard fashion. It is hardly surprising that I am tempted to wonder whether this company's computers are prone to blinking on and off too.

Our illustrious editor has a retractable ball pen from a celebrated mainframe manufacturer. If you push one particular button on the pen, part of it flies across the room. Maybe it's a secret weapon!

Luckily the calculator is small enough to fit in an airmail envelope if it has to be sent to Japan for servicing. Anyway, it's in good company in its ailing condition. My television, and my cassette recorder, and my electronic alarm clock are all on the fritz with similar chances of ever getting them fixed. I am told that if I take a day's leave off work to carry the TV to some place in Edgware there might be someone there who would deign to look at it. The cassette recorder, on the other hand, has to go to Tottenham. Where exactly I don't know. Their phone is always engaged.

And I spend so much time at conferences listening to people say that all this microelectronics is going to put thousands of service men out of work! Lewis Carroll, thou shouldst be living at this hour.

20th Century Faux

THE Post Office has been blowing its own trumpet quite a bit lately to promote Prestel. All this fuss over 20-year-old technology, say I in my cynical way. Anyway, at the Viewdata 80 exhibition the PO had a show called Fanfare for Prestel, compered by master showman and outgoing Prestel director Alex Reid.

The main part of the show was a film with Leonard Rossiter which was quite the most amateurish concoction I have seen in a long time. Crackly sound, flickering picture, and the plot? Well, it was called "The Prestel Connection" and Rossiter played a private detective who finds Prestel a much more useful source of information than his usual methods. The Post Office is in no danger of winning an Oscar.

Still, maybe it's an effort not to take over Hollywood's job. Remember Sam Goldwyn's comment on a moralistic script: "When I want a message I'll call Western Union."

"I'd like something in the Regency style for the drawing room..."

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MICHIE'S PRIVATEVIEW

Race to beat acceleration of complexity

AS a response to widespread economic stagnation and accompanying crises of confidence with regard to technology, the EEC's Forecasting and Assessment in Science and Technology programme* seeks to bring modern analytical methods to bear upon these ills with the aim of combating them. The phenomena certainly seem real enough. Yet superficially they are distinctly odd.

Take economic growth, or non-growth. The productive capital of industrial nations is not actually shrinking. Moreover it is being steadily transformed in nature by the continued advance of technology. What is the nature of this steady transformation? Fixed capital is getting more productive. I type this article 50% faster than I would have done before the electrification of typewriters; and six men can mow more meadows than is needed to offset the rental of their mowing machines.

Moreover, technology is not merely advancing at a constant rate. All reasonable scales of measurement show it to be accelerating. So something nasty must be in the works, clogging up that cornucopia which by now should surely be delivering well-merited abundance to us all.

Everyone is, I think, united in a common sense of grievance about the matter. But people differ as to which component in the whole process should be in the pillory. To some it is evident that the shop stewards of our land, possibly in league with tightly-knit politically-motivated subversives and wreckers world-wide, have worked the whole baleful trick. To others the master culprits are to be found in the board-rooms of the giant corporations and finance houses, possibly in league with tightly-knit politically-motivated multinationals and cartels, topped up with a gnome or two of Zurich.

There is a third school of thought, not inflammatory like the foregoing two, but twice as loony. This school puts the blame on technology itself. I have remarked before on a fellow-citizen of mine who set out systematically to punish a non-vending vending machine, and was not satisfied until all future capability had been removed from it.

Perhaps, though, the anti-technology school is not entirely loony. At least we should consider the idea, since the analysis given earlier makes technology look uncommonly like a non-vending vending machine!

I believe that we have to take a long backward look over the sweep of our history, and ask whether there has been any settled evolving pattern running through it. Such a pattern does stand out. The discovery of agriculture set it going. But through all the dozen or more millenia since then our ancestors seem to have been quite unaware that a unidirectional process was in train until the last phase of acceleration during the 19th and 20th centuries. The consistent pattern, step by painful step, with many falterings and setbacks, has been the augmentation of man's comprehension and control of his world.

How has it come about? Without doubt through technology, leavened in recent centuries by a pinch or two of science. I use "technology" in its broad sense to include all the useful arts.

So if science and technology give us comprehension and control, and if their power and extent is accelerating, does it not follow that so too must man's mastery of his environment, including the production of wealth? Here we come to the nasty bit.

If the said environment stayed put, then well and good. But comprehension and control must be measured as a ratio. Specifically we must relate the power of our instruments for comprehending and controlling to the complexity of the environment to which they are to be applied.

A prime consequence of the rise of technology has been that man's environment is increasingly a man-made artefact, and one which, in the nature of the whole process, becomes more and more complex.

So let us go back to the comprehension/complexity ratio. So long as the acceleration of the numerator exceeds that of the denominator, we are winning. If it is the other way around, then sooner or later complexity begins to be spawned faster than our ability to understand and subdue it.

The flip-over point, in my view, was reached by industrial man at some point during the past decade. Fewer and fewer people are employed to produce. More and more are employed in the effort to keep track of what is going on.

Fortunately there is contained in technology's most recent spurt the germ of the countermeasures which we need. I refer to information technology, which, God knows, makes its own contribution to social complexity. It does, however, contain the potential for enormously augmenting the human ability to pierce the infrastructural chaos of our lives with generalising laws and insights.

Professor Donald Michie is head of the Machine Intelligence Research Unit at Edinburgh University.

The relevant branch of study, where artificial intelligence overlaps automation, has been termed "soft" automation. It is increasingly needed for cleaning up some of the complexity-pollution which hard automation tends to generate.

In its capacity to give seven-league boots to the complexity-fighters — statisticians, economists, planners, executives, production engineers, administrators, politicians, teachers and instructors, as well as the scientists and technologists themselves — information technology has scarcely had a chance yet to show its paces.

One of the troubles is that at Cabinet level information technology is regarded as just one more lump in the technological porridge. But now we have a Prime Minister who is a trained chemist, a field equipoised between science and technology.

I nourish a lively hope that the porridge approach to our perplexities will give place to more differentiated styles. Let us hope that the information engineers will be passed the ammunition before the complexity hits the fan.

REFERENCE

* Forecasting and Assessment in the field of Science and Technology. Subprogramme B: Information Society. Report *FAST/ACPM/79-14-2E*. Directorate-General for Research, Science and Education of the Commission of the European Communities. Rue de la Loi 200. B-1049 Brussels. 1979.

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FOCUS

Getting it all together...

TIME was — and it was not so very long ago — when the installation peripherals were limited to the site shredder, guillotine and coffee machine. Now it is becoming hard to see the mainframe for the surrounding peripherals.

In fact the peripheral market-place appears to be taking over whole areas of computing. DPMs no longer refer to their systems as a basic IBM 360 or ICL 1900. Their configurations are now made up with substantial numbers of compatible equipment, with the range extending from the mainframe itself, to disc and tape subsystems and add-on memory.

That this will pose problems for the compiler of the product installation listings in future editions of the Computer Users' Year Book is more than likely. It is certainly not the present trend to allow the mainframe manufacturers to take for granted the supply of related equipment such as line printers, VDUs and storage media.

Few would challenge the premise that the peripheral OEM and PCM marketplace is the most competitive in the DP industry. One month or so after IBM announces a new improved product, the independent suppliers are competing to offer the equivalent product at a lower price and probably improved performance. In some cases, the independents are introducing new IBM-compatible products even before IBM has developed the new technology.

According to the brochure of the Peripherals '80 Exhibition, exhibitors will be confined to the area of computer peripherals. The organisers will quickly discover for themselves that such a policy is a non-starter. Peripherals have a habit of spreading faster than even micros or word processing systems.

The peripherals market is essentially user-oriented. The average consultant would be as out of his depth in this company as would a square dancer at a night club. Consultants are taught to play safe and as a result, the rules of their game are to specify one-stop shopping with the fortunate supplier being allowed to pick up all the peripheral pieces.

Such an approach in the US would be regarded as being very square. There, price and performance come well before taking the easy option. Given the existing considerable shortage of DP professionals, taking full advantage of all available peripherals makes additional sound sense — especially as most DP budgets reveal that personnel are taking an ever higher percentage of the total available funds.

Seemingly, it is the users themselves who are substituting expensive personnel for the electronic machine. Apart from word processing operators, who are currently the most sought after people in the job ads, users are shunning any business machine which requires specialist personnel.

Peripherals and packages in fact go very much hand in hand. Peripherals 80 could well see the vendors handing out their individual supplies of sales literature.

But in the DP world, the merit of peripheral and terminal equipment lies in getting it all together, either at an exhibition or in the installation.

10 years ago

From Computer Weekly of April 2 and April 9, 1970.

THE long awaited unbundling of IBM software proved to be a non-event. In the UK, the changes were not due to come into effect until 1972.... Giving evidence to Commons Subcommittee D, Computer Technology's MD Jenn Barron said the UK lacked the resources or qualified personnel to support a comprehensive computer industry and urged the government to encourage the establishment of a European industry.... Only a year after installing a CDC 6600 system, London University got the Computer Board to agree substantial additions.... Pursuing its campaign of a new product per month during 1970, the Singer division of Friden launched the System Ten.

Doctors' DP study

A FEASIBILITY study on how doctors can best use computers is to be carried out by Scicon for the British Medical Association. The data processing needs of doctors, and whether these can best be satisfied by central mainframes or local microcomputers, will be investigated, together with the question of how much doctors would be prepared to pay for such a service.

The BMA is hoping to get government funding to cover 50% of the £21,000 cost of the project. The association itself will then pay 25% and Scicon the last 25%.

There have been local medical computer projects such as the Exeter Community Health scheme, but this is the first time the issue has been looked at nationally. According to Dr John Dawson, an undersecretary at the BMA, there are at present 20 to 30 doctors in the country using computers, as opposed to the 26,000 GPs there are in total, working out of 8,000 surgeries.

Change of tack over 8100 DMS

IBM has changed tack and delivery dates on the DMS development management system for its 8100 remote processing system. The original product generated Cobol source code which then had to be compiled and linked-edited before it could be debugged — a lengthy and not necessarily very easy procedure since the automatically generated code did not look much like programmer-generated Cobol.

Instead, IBM is now offering what is, in effect, high level language which can be used at a terminal to write programs into a screen format, test them interactively and change the variables until the program is satisfactory.

Once the program is complete, it is transmitted to the site where it is to be used, since IBM conceives of the 8100 normally being used in multiple locations, one of which will be a central development site normally adjacent to the host 370, 303X or 4300 mainframe. It is not possible to write 8100 programs on a 370-type host.

In the original version, it would have been necessary to go through intermediate compilation and link-edit routines before testing the Cobol source.

Two program products are offered for the system, which is called DMS/DPPX, DPPX being the native mode 8100 operating system.

DMS/Test Function is used for program development and testing, and only one copy will normally be needed. DMS/Execution Facility is an interpreter for DMS and will be needed at each site where DMS programs are to be run.

The latter allows programs to be run either in batch under the base DPPX operating system, or interactively using the DPPX/DTMS database system, where all the facilities of DTMS can be accessed and programs can communicate with CICS/VS and IMS/VS on the host.

IBM users are target for comms monitor

IBM users are the target for a communications monitoring system introduced by Tesdata called RM 200, which can provide real time information on factors like response times and polling delays for up to 32 lines.

The RM 200 costs about £30,000 and is a development of the MB 109 data communications resource management system announced by Tesdata last year (CW, November 8, 1978). The most significant difference is that the RM 200 can be used by itself while the MB 109 has to be added to an existing Tesdata advanced measurement system, bringing the total cost to over £100,000.

The main role of an AMS is to monitor the overall performance of the host mainframe and peripherals.

The RM 200 can monitor lines using the bisynchronous SDLC protocols. It can be mounted in a standard 19-inch rack alongside the users' modems.

Tesdata expects the RM 200 to widen its customer base of IBM users which, till now, has consisted primarily of bigger 370 and 303X installations.

Alpha MicroSystems gets £350,000 boost from finance group

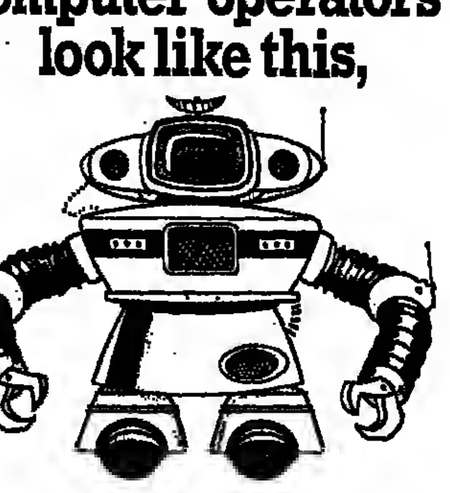
THE first outside investor in Alpha MicroSystems (UK), Technical Development Capital, is putting £350,000 into the company. TDC, part of the ICFC finance group, is buying 25% of the shares and putting up additional working capital.

Alpha MicroSystems is the master distributor for Europe for three ranges of large microcomputer systems supplied by Alpha MicroSystems of Irvine, California. The systems, which use a 16-bit microprocessor based on Western Digital chip sets, cost between £10,000 and £100,000.

Since February of this year when a recruitment campaign was launched, the dealer network has enlarged to include 18 UK dealers. The company's policy is to give discount to dealers dependent on the level of front-end support offered.

To expand Alpha MicroSystems' share of the business market Leslie Button, managing director, has long term plans to move into electronic office systems.

The day computer operators look like this,



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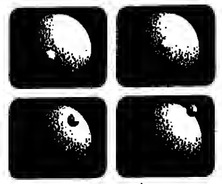

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SOFTWARE FILE

4300 launch blamed for ADR's low profits

THE announcement of IBM's 4300 series is thought to be behind profit described as "disappointing" at the huge US software products company Applied Data Research. Profit wns down from $1.98 million in 1978 to $524,657. Turnover was said to be on target for the year at $28.7 million, a 27% increase on the 1978 figures.

• Applied Data Research is best known for Librarian and other systems products for large IBM users. It is thought to have suffered a setback when potential uaers hung back on product purchases following the 4300 announcements. A lot of its efforts last year were put into building for the future.

According to the president, John Bennett, such start-up efforts and heavy investments in research and development were primarily responsible for results "well below expectations".

The Datacom product line in particular did not do well in its first full year with ADR but is expected to improve now that it is fully integrated with other software products.

The company's software products division is said to be doing well following the acquisition from the UK software company CAP-CPP of its five European subsidiaries (CW, March 29, 1979).

Bank picks Datamanager

THE Hong Kong and Shanghai Bnnking Corp. one of the largest banks in Asia, is to use the MSP product Datamanager 10 control its data resources. The system was chosen because of the range of DBMSs with which it interfaces and its ease of use.

MSP plans further visits to Hong Kong in this month to foster interest in Datmanager among a dozen of the 20 or so IBM 360/370 users there.

Portable Socrate?

A MAJOR development programme to produce a portable version of the French Socrate database management system has been launched by ECA Automation, a member of the Thomson Informatique group of companies.

The Ministries of Industry and Defence are backing the project, which involves developing a portable subset of the database, to be available in October, and versions specialised to particular machines.

Version 1.7 for the Honeywell Level 66 line is due in October 1980, version 1.8 for the SEMS Mitra mini in July 1981, a version 1.7 for the CII-HB Level 64 and DPS 7 in July 1981 and a version 1.7 for the Honeywell Level 6 mini in December 1981. IBM and SEMS Solar versions are also planned. There are currently 120 Socrate users in France.

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by Claire Gooding

Tandem Nonstop mini catches Mumps

MUMPS, the high level language used for data management has been made available by Tandem, the manufacturer of the multiprocessor minicomputer Nonstop. Mumps has been increasing in popularity for the manipulation and sharing of data.

Mumps arose from Massachusetts General Hospital's multiprogramming system, which met a need for a language which could manipulate text strings with a file management system in an interactive time-shared environment.

It is mostly used in dialogues between the user and the computer in which data is displayed and collected. The system validates data entries, checking on format, length and numerical size, and requesting corrections where errors occur.

The Tandem Mumps supports all features of the 1977 Ansi standard for the language, but runs under Tandem's own Guardian operating system and Enscribe file system, thus allowing users to execute Cobol, Fortran, and TAL programs concurrently.

Multi-user Cobol compiler

A MULTI-user Cobol compiler has been introduced by Ryan-McFarland for Texas Instruments' DS990 Model 1 and Model 2 business computer systems. The package, RMI COS 990, is designed for development, completion and execution of Cobol business applications.

Over 60K-bytes are available for user programs in a 64K-byte system and the RMI COS990 Cobol is source-compatible with TI's DX10 Cobol. The product also features a job description language and includes a cross compiler and conversion utilities that operate on the DX10.

Artificial Intelligence boost from RTL/2

AN RTL/2 compiler for the ICL 2900 has been developed by systems house SPL in conjunction with ICL Dataskil. As a result, the artificial intelligence laboratory at Queen Mary College, London, has already acquired an RTL/2 compiler for its ICL 2060.

The college has been involved in robotics for some years (CW, March 29, 1979) and has been using RTL/2 on its Digital Equipment PDP-11 under Unix and the multi tasking system developed by ICI. RTL/2 was fixed upon as a standard language for projects in the laboratory two years ago, for its portability and ease of use.

The language is to be used in projects including the development of picture processing software and the control of mobile robots and telemanipulators. QMC will also use SPL's cross compilation facilities.

The laborntory was also involved in the re-writing of the multi-tasking system to reduce machine code and make it machine independent. The result, standard multi tasker, is largely written in RTL/2 and allows more rapid production of robot control software. Combined with SMT, it enables programs to be transferred easily to new and powerful micros.

Both SMT and MTS are marketed by SPL, which hns recently entered the robotics field with the newly formed British Robotic Systems (Software File, March 5).

Geosystems in US

THE UK-based datnbase producer and information management consultancy Geosystems has opened a North American office in Cambridge, Massachusetts. Geosystems offers an online bibliographical dntabase, Geoarchive, via the Lockheed Dialog information service.

Computer Board backs Microsim

CONSULTANCY Pactel and software house DM England have entered the lucrative educational market with a sale to over 50 outlets of their joint product, the Microsim microprocessor development system, through the Computer Board for Universities and Research Councils.

The decision was taken on the advice of the board's software provision committee, which confirmed a high level of interest in the product among heads of computer departments following a mail shot to 60 universities after several inquiries from individual faculties.

There were several firm orders even before the board undertook to fund the bulk purchase at a discount cost of over £1,200 per university.

Microsim is e software peckage biased towards development projects, using the standnrd assembly language for the chosen microprocessor.

Its developers refer to it as an "inter-assembler" since it combines nn assembler, interpreter simulator and link loader in such a way as to make them invisible to the development programmer.

The assembly code is accepted and analysed line by line, and errors detected immediately with explicit and comprehensive error messages. The text is ready to run as soon ns it is entered.

Microaim also distinguishes between data storage and instructions, and stops any illegal actions whan the program is run, displaying explonatory warnings. Linking is also achieved "invisibly", and immediately.

The packnge is writtan in Fortron IV ond versions exist for the Intel 8080/85, Zilog Z80 and RCA Cosmac chips. In responae to firm orders and interest from Intel, others are under way for the Intel 8086, the Motorola 6800 and the MOS Technology 8502, as used in the Apple and Commodore Pet machines.

The syalem works undar host machines which at present include Prime, under the Primos operating system, Honeywell Level 68 under Multix, and the Digital Equipment PDP-11 under RSTS, RSX, RT-11 and IAS. It requires a minimum of 56K-bytes main memory plus discs.

The amount of memory needed by Microsim may hava hamperad its sales and, as yet, the sophisticated aids it supplies have not overcome market realstance to assembly language.

Judging by the response from universities, the syslem is well suited to educational needs. It is to be installed in two southern universities which will act as distributors of software to other users.

MP/OS op system on Nova 4

DATA General has put its multi-tasking MP/OS operating system on the Novn 4, which previously only supported the real time disc operating system, RDOS. MP/OS was originally available only on the 16-bit Micronova microcomputer.

MP/OS also supports Pascal on the Micronova and Nova, and Data General says that the language has been enhanced for multi-tasking operations such as process control, real time data capture and laboratory operations.

The MP/OS system is compatible with the AOS operating system used on Data Generals range of scientific and commercial Eclipse systems, which allows upware compatibility across a wide range. MP/OS is said to improve performance and capacity by eliminating multiple seeks.

Pascal also extends across the whole Data General range, and has been implemented to simplify program development and allow multi-tasking.

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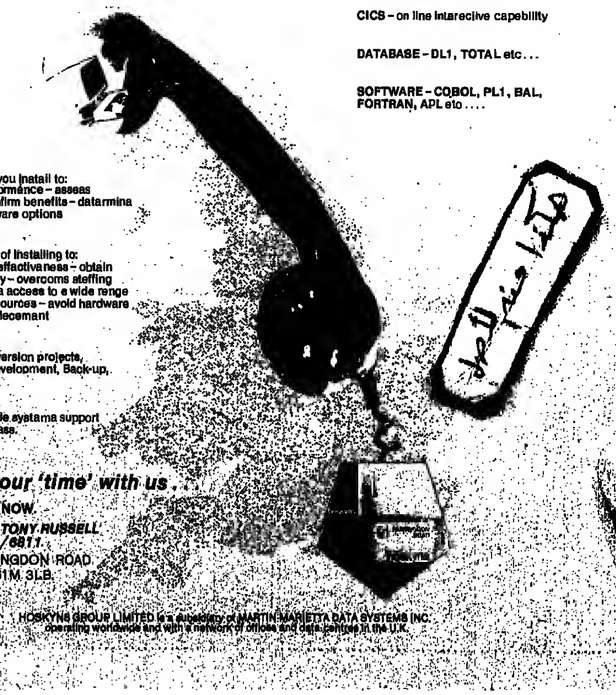

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OP SPOT

by Bernard Allen

What are you looking for —money or promotion?

Practical hands-on training is a vital part of any course in operations. For John Greggor (standing) and John Thompson, Threshold students at St Helens College of Technology, such training is provided on St Helens Borough Council's ICL 1902T.

WHAT do you, as members of the operations fraternity, consider to be the more important factors — a good salary and security, or the chance of promotion either inside or outside the operations department?

I put this question on behalf of a senior operator who is quite satisfied with his salary and conditions of employment, but would like to know how his "lot" compares with that of other operations staff.

He writes, "My salary and shift allowance come to about £5,800 per annum. However, with overtime I expect to gross in excess of £8,000 this fiscal year.

"I also get other benefits, including a non-contributory pension, cheap mortgage and luncheon voucher worth 40p a day."

Week 1	Monday days,	Tuesday days,	Wednesday nights
Week 2	Thursday days,	Friday days	
Week 3	Monday nights	Tuesday nights	
Week 4	Wednesday days,	Thursday nights,	Friday nights.

The operators work five additional days over a three-month period.

Figure 1

Our friend is also happy with the site's twelve-hour shift system (see Figure 1) and having to "come in five other days in every three months in order to make up the required 121 hours per month."

On the other hand, he has little chance of promotion despite having considerable skill and experience.

"I have worked in operations for almost seven years. In that time I've worked on IBM 370/148s, 370/158s and an IBM 3033, under OS, OS/VS1 and MVS."

He modestly describes his JCL experience as "reasonable but not outstanding," and says that at his installation the operators are "openly discouraged" from applying for positions in programming.

"Positions such as JCL writing, operations support, technical support and TP support are not taken up by the operators. Even our operations manager didn't come up through operations.

"We have just one shift leader and a deputy shift leader on each team. And during my time at the installation there has been just one promotion to shift leader and none to higher positions."

I suppose it all depends on the sort of person you are and what you want out of life. At the larger installation, like our friend's, the operators are expected to wait a long time for promotion out of the computer room and off shift work.

Management may well argue that technical expertise is needed on-line, and that's fair enough providing the operators are extended and their skills put to full use.

But at this correspondent's installation there are operations and technical support sections, which implies that the operators call in support staff rather than sorting out problems themselves.

Consider his operations experience; seven years on large IBM mainframe running under various OS operating systems. Such experience could, depending on the operator's personality and inclinations, be put to good use in such area as technical support, applications support, systems programming, operator training, or in certain supervisory positions.

Any operator who can earn £8,000 a year isn't doing too badly. That does, however, include a shift allowance and a certain amount of overtime.

The benefits he gets are good by most standards. Personally I don't like cheap mortgage schemes, as they tie the operator to the company and restrict his freedom of choice to a certain extent.

Adding to skills

IT'S good to hear about operators who are interested in adding to their skills and expertise. More than 60 such operators have bought copies of the George 2 Anthology of Presentations, so George 2 User Group chairman Ron Linton tells me.

A collection of lectures, hints and tips presented at group meetings in recent years, the anthology costs £1.50 per copy. Cheques should be made payable to the George 2 User Group, and copies are available from Ron Linton, Manchester Polytechnic Computing Services, John Dalton Building, Chester Street, Manchester M1 5GO.

Do married over-35s make better operators?

COMPUTER operations was the subject of discussion at a meeting of the Harlow branch of the British Computer Society the other week.

Those present included a systems programmer, an operations manager, a manager from the paper manufacturing industry and a teacher. But surprise, surprise! — there were no operators in attendance.

Anyway, in your absence, we discussed all sorts of matters relating to operations, including training, careers and shift work.

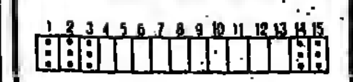
The man from the paper industry came up with some particularly interesting comments.

He pointed out that when you take on lots of young and ambitious operators many will not be able to get the promotions they want, and will therefore become unhappy and disillusioned.

The computer industry might, he suggested, do better to recruit married men of 35 years and over as operators. Such persons are employed on permanent night shift in the paper industry, and a very fine job they do, too, he added.

What do you think of that? I am particularly interested in hearing from operators who are over the age of 35. Why haven't you moved out of the computer room and how does shift work affect you?

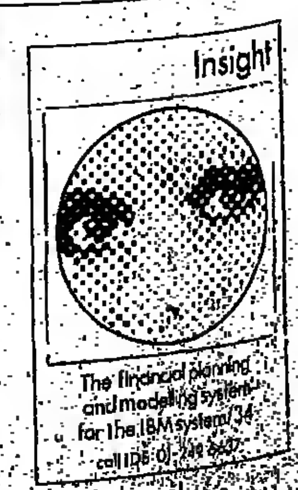
Puzzler



FIFTEEN counters are grouped 3-3-3 at one end of a 15 cell line, and 3-3 at the other, with 10 empty cells between. The problem is to reach a one-counter-to-one-cell state in ten moves.

Each move must consist of picking up a counter, passing it in one direction left or right, and finishing at an empty cell. One good "try" is 15-12, 15-13, 2-11, 14-9, 14-10, 2-8, 2-7, 1-6, 1-5 . . . but then the cell 3 situation cannot be resolved.

See page 29 for solution.



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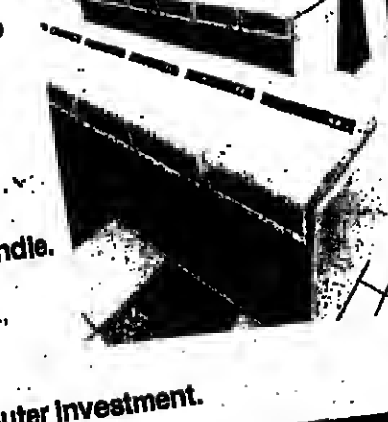
To: IBM Users
Subject: 635 Megabytes per Spindle

The Memorex 3652 double-density disc drive has greater capacity than any current IBM drive, including the new 3370. Compared with the IBM 3350, it gives twice the data in the same floor-space, lower cost per byte, and faster access times. Unlike the 3370, the 3652 can be attached to 370 and 303X processors as well as the new 4341. It operates logically as two 3350s, so that conversion is minimal.

For extra performance, an optional 2.28Mb fixed head area is available, giving 18Mb per full string. And by teaming the 3652 with the Memorex Intelligent Dual Interface, we can further improve your throughput by giving two data paths to the CPU.



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MEMOREX

Tote puts its shirt on ME29 power

THE first organisation to announce an order for the new ICL ME29 is the Horserace Totalisator Board's Tote Computer Services subsidiary. Underlining the power of the new system, the Tote is upgrading from an ICL 1903A, which was taken on rental in 1973 and converted to a sale in 1977 at a total cost of nearly £300,000.

The ME29 configuration will cost substantially less: about £160,000 for a 1-megabyte processor with 500 megabytes on disc, two 8-track tape units and a 1,100 lpm printer.

"We're sixth on the list and we expect to get the machine between September and November. As an early customer we are getting special attention from ICL: they are putting in a project team," TCS general manager Mike Brooks told Computer Weekly.

"TME appears to be based on the EMOE executive with much improved communications bolted on and, as I understand it, conversion from 1900 is about the same as moving from a 1900 to a 2903: you just need to recompile. We will be going to TP in the long term. We are taking Prosper, Cobol, RPG and Plan and we are very pleased with the machine.

"I think it is the best bit of kit ICL has brought out in a very long time. We will be advertising for staff, but we've had inquiries already from people who want to work on the ME29."

ICL France aims for 100 orders by September

ICL France is hoping to have installed 100 ME29s by the time it closes its books on the current financial year at the end of September.

The French Press has hailed the ME29 as the beginning of ICL's "E" series, the E series being the IBM line which emerged as the 4300.

"The ME29 is pitched at a very crowded market place which includes the IBM 4300 and System 38 and the CII-HB Level 64. One ICL representative has identified 23 competitors," says Ordinateurs.

"But the orientation towards transaction processing, teleprocessing and office automation is much stronger than that of other machines.

"At first sight, the ME29 is original, unquestionably more so than the System 38, which has still not fulfilled its promise. The inclusion of a Transpac interface, video circuits for standard television sets, hardware and software for word processing, coupled with the power of the CPU, opens up a number of market sectors hitherto monopolised by specialised machines."

01 Informatique is particularly impressed by the price-performance of the ME29.

"It is unquestionably in the area of price that the ME29 appears particularly seductive," says the paper, quoting prices which, unusually, are about the same as UK prices. Most companies pitch their foreign prices above the domestic price.

Bargain sales pave the way to new IBM 3850

THE IBM announcement of very cheap extension frames for the 3850 mass storage system (CW, March 20) is an attempt by IBM to sell off its stocks of existing 3850 kit before introducing a new 3850 with twice the storage density.

This is the view of Bob Fertig, president of the technology analysis group at Advanced Computer Techniques of New York. According to Fertig the new 3850 will employ the same honeycomb of cartridges and the same reading mechanism as the existing system but it will read and write data at twice the density.

Another feature will be the use of the 3880 disc controller and 3370 drive as the disc staging system.

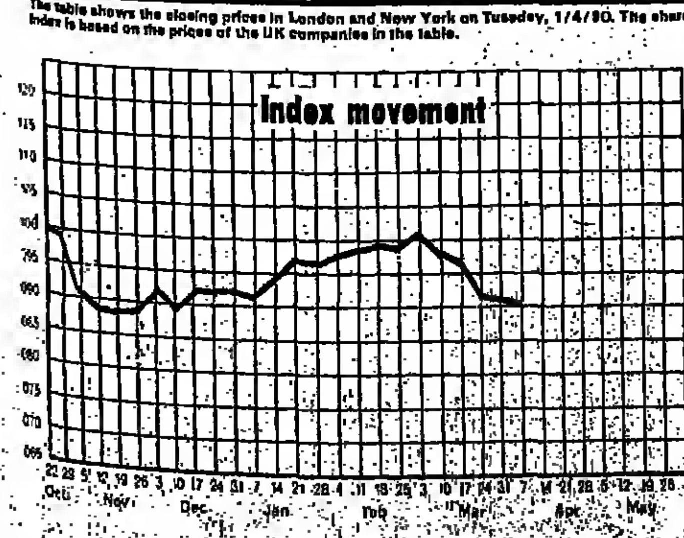
Fertig has also predicted that IBM will introduce a floppy disc stack system with a maximum capacity of 4,000 megabytes. It is known as Prospector within IBM.

CW SHARES TABLE

Sep 1/4/30 — Index 80.66 Change —1.12

1980 High	1980 Low	London Stock Exchange Stock	Pence Price	Pence Change	$ 1980 High	$ 1980 Low	New York Stock Exchange Stock	$ Price	$ Change
335	230	A. Comp Tech (75p)	310	−5	19½	15	AM International	15	−1⅛
43	28	B. Boy Kent (25p)	78	−3	27½	19½	Ampex	24	+⅛
137	128¾	Burroughs (£5)	131¾	+12⅞	39	33⅝	Automatic Data Proc	34⅝	+1⅞
78	52	Chloride (25p)	57	−1	84	67⅞	Burroughs	80⅜	+2⅞
120	100	Chubb (20p)	100	—	23⅛	18⅝	Computer Sciences	18	+1⅞
100	84	Cole (R H) (25p)	84	+1	50⅝	45	Control Data	47⅞	+2⅞
610	540	De La Rue (25p)	615	+6	78⅞	58⅞	Digital Equipment	63⅝	+3⅞
190	148	Exrel (25p)	184	−2	38⅞	29⅜	Harris	30	+⅜
512	407	Ferranti (50p)	450	−2	69⅛	57	Hewlett Packard	67⅞	+2⅞
319	335	GEC (25p)	372	+14	97⅞	71⅞	Honeywell	71⅞	−4⅞
441⅞	124⅞	Honeywell (£1.50)	134⅜	−1⅜	74⅞	50	Intel	62	+2
131	124⅞	IBM ($1.25)	120	+11⅞	70⅞	64⅞	IBM	64⅞	+⅜
143	115	ICL (25p)	120	+3	18⅞	12⅜	Memorex	12⅜	—
74	44	Kalamazoo (10p)	73	−1	61⅞	40⅞	Motorola	61	+1⅜
240	203	Kode Inter (25p)	200	−7	28	18⅞	National Semi	21	+1⅜
126⅞	121	Motorola ($3)	122	−11⅞	78⅞	67⅜	NCR	67⅜	+⅜
270	180	Muirhead (25p)	188	+4	40	37	Perkin Elmer	39⅜	+7⅞
1119	102	NCR 4% 93/98	162	−12	61⅞	40⅞	Rockwell Inter	61⅜	+4⅜
1157⅞	1325	Perkin Elmer 4-4	1132	+11	119⅜	90	Schlumberger	108⅜	+8
470	375	Philips Lamp (Fl 10)	375	−5	57⅞	47	Sperry Corp	48	−2
149	108	Plessey (50p)	130	+3	30⅜	30	Tandy	32⅞	−⅜
327	190	Racal Elect (25p)	213	—	63⅞	48⅜	Tektronix	48	+2⅞
84	65	Rediffusion (25p)	65	−9	100	83⅜	Texas Instruments	83⅞	+⅜
171	120⅞	Rockwell	123	+12⅞	47	40	TRW	42⅞	+2⅞
151⅞	140⅞	Schlumberger ($1)	149⅞	+14⅜	8⅞	6⅞	Wyly	7⅞	+⅜
126⅜	121⅞	Sperry Corp ($0.50)	121⅜	+1⅜	55⅜	53⅞	Xerox	53⅞	−⅞
121	117⅞	TRW Inc ($1.25)	118⅞	+11⅞					
324	280	Thorn EMI (25p)	292	−22					
121⅞	121⅜	Xerox ($1)	125⅜	−11⅜					

The table shows the closing prices in London and New York on Tuesday, 1/4/80. The share index is based on the prices of the UK companies in the table.



System flowing with honey

IF readers think that the person in our picture (left) clad in protective gear is consulting a computer printout, they are right. They would also be right in thinking that the unusual looking structure in the foreground is a beehive.

The link between the two is a production control system for apiaries developed by a bureau at Limerick, Ireland, called Gaeldata. The system is based on the Series 21/40 distributed computing system from MDS and the first installation is at Mil an Tsulain, an organisation which maintains over 600 hives at several apiaries spread over the west coast of Ireland.

Software developed by Gaeldata includes an input vetting program in the MDS language Mobol which checks the 100-plus variables that can be entered for updating the master record maintained for each hive.

The printout produced each day says which hives should be inspected and what diet should be applied. Gaeldata has also developed statistical programs for aiding long-term breeding.

The 21/40 at Mil an Tsulain includes 64K-bytes of main memory, three floppy disc drives, an MOS 2141 printer and one video terminal.

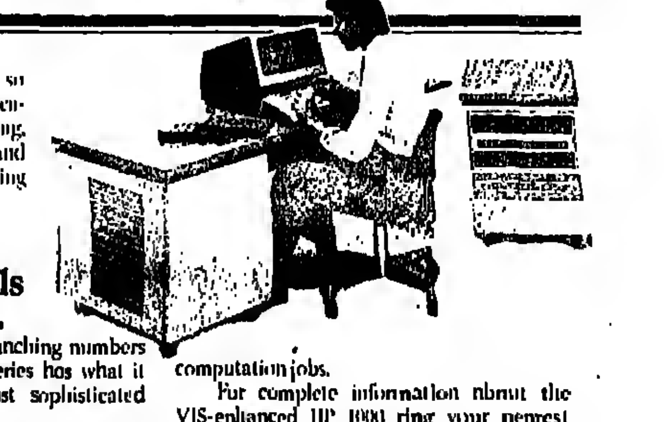
The name, Mil an Tsulain, incidentally, is nothing more mysterious than the Gaelic for honeybees.

Olivetti takes 10% stake

AS part of the agreement between Olivetti and Memorex to set up a joint manufacturing venture in Northern Italy (CW, April 3) the Italian company's peripheral subsidiary is taking a 10% stake in the new Memorex subsidiary formed to develop, manufacture and market 8-inch fixed discs (CW, September 9, 1979).

The first product from the venture, based in an existing Olivetti plant, will be the 11.7-megabyte Memorex 101 8-inch disc drive.

HP introduces the Matrix Machine.



If you've been thinking that only a 32-bit computer can handle your matrix intensive jobs, think about this: with HP's new Vector Instruction Set (VIS), the HP 1000 does matrix inversions at speeds comparable to a 32-bit mini. At less than one-third the price.

The HP 1000 F-series computer has always been ideal for complex scientific calculations involving floating point arithmetic, trigonometric and logarithmic functions, and other computation-intensive problems. Now it's even better.

With VIS, you can perform vector and matrix arithmetic at speeds you wouldn't have thought possible on a 16-bit computer. A single vector addition statement like CALL VADD, for example, replaces a FORTRAN DO loop to execute some applications up to 10 times faster.

And by taking advantage of the HP 1000's Extended Memory Area, VIS can address extremely large data sets (up to 1.8 megabytes) in main memory. All array and memory management tasks are handled automatically, so you can do large array applications like image processing, 3-dimensional graphics, and simulations. Without writing any new software.

Speed plus accuracy equals performance.

Even if you're just crunching numbers and not matrices, the F-series has what it takes to handle the most sophisticated computations.

A hardware-implemented Floating Point Processor gives you three levels of floating point precision for up to 17 significant digits of accuracy. And separate polynomial and scientific instruction sets make it easy to do highly accurate calculations involving a wide range of trigonometric, logarithmic and other complex functions – all at hardware speed.

Crunch a matrix today.

Invest a little time to find out how the HP 1000 sixteen-bit computer makes light work of matrix arithmetic. At £27,600* it might save you from investing more money than you need to for your sophisticated computation jobs.

For complete information about the VIS-enhanced HP 1000 ring your nearest Hewlett-Packard office or contact Hewlett-Packard Ltd., King Street Lane, Winnersh, Wokingham, Berks., RG11 5AR. Telephone: Wokingham (0734) 784774.

Matrix Inversion Times**

Size	HP 1000 VIS-enhanced F-series	32-bit Mini-computer
50x50	1.8 sec	1.5 sec
100x100	12.3 sec	11.7 sec
200x200	105 sec	92 sec
400x400	690 sec	720 sec

** Benchmark method – Matrix Inversion using Gauss-Jordan Elimination.

*Prices correct at time of going to Press.

HEWLETT PACKARD

PEOPLE and EVENTS

Solving the FA's problems

THE administrative and accounting problems of the Football Association are to be solved by a Kionzia K2000 computer. The governing body of football controls about 37,000 football clubs and organises all international fixtures in England, as well as the FA Cup.

In our picture FA chief accountant Paul Masters examines the new computer with Maria Del Nevo, computer operator. The K2000 is to handle a number of applications, the main one being on integrated purchase, sales and nominal ledger system.

David Garnsey, until recently a director with John Goldsmith Computer Recruitment, has now established his own recruitment business in Epsom, Surrey. To be known as Index Systems, the company will specialise in contract support staff for the UK and overseas.

'Outstanding merit' in telecoms engineering

TWO top telecoms men at the Post Office have been elected Fellows of the prestigious Fellowship of Engineering. They are John Whyte, deputy managing director of telecommunications, and Roy Harris, director of systems evolution and standards.

Whyte began his career at the PO radio research labs at Dollis Hill. In the 1980s he was seconded to the Treasury where he headed a drive to encourage the use of computers by government departments.

More recently he was responsible for the plan to replace Britain's electromechanical telephone equipment with electronic equipment, and in 1976 was awarded the CBE for his work in promoting British telecoms exports.

Roy Harris has been involved with electronic switching since the early days of research in this field and was the originator of the System X family of advanced switching systems.

The Fellowship of Engineers consists of chartered engineers who are considered, by virtue of their achievements in the field, to be "of outstanding merit."

Whyte

Harris

Tony Legg has been appointed client services manager at Quantime. He formerly held a similar position with Libra Computing.

Henry Tinker has joined Cipher Data Products as vice-president of operations. He was previously with Qume where he was vice-president of manufacturing.

Stanley Silverman has become director of market planning, a new position with Ampex. He was formerly with Diablo Systems, where he was manager of product marketing.

Ash Upadhyaya has become European software support manager with Sentinel Computers Europe. He used to work for Philips as a senior systems analyst and has just returned from 18 months in Canada.

Peter Carroll has joined CMC's technical support division in pre- and post-sales support. He joined the company after three years with British Leyland where he was a senior programmer.

Bill Hamblin and Paul Raubusch have both become sales executives with Versatec. Hamblin joins from SE Labs and Raubusch from Laser-Scan.

Graham Matheson has become sales manager for Software Architects. He was previously a senior consultant with Scicon.

Jerry Lipman, Ko-Rec-Type's European managing director, has left the company to start his own import and export business.

Robert Watkins is the new chairman of the board of Electronic Conventions. Watkins, of Raytheon Company, succeeds Jack Logan, who remains on the board.

Ripley Pedro has been appointed technical manager with Lion Micro Computers. He joined the company from Lasky's where he was top technical consultant.

Stanley Ward has become operation services manager with the British Road Services group. He will be responsible for design development and management of computer and communications support systems in the group. He joined BRS just over a year ago.

Stephen Forte has been appointed managing director of American Microsystems Europe. He will be responsible for AMI sales throughout Europe, Africa and the Middle East. He was previously with General Electric Microelectronics where he held the positions of managing director and vice-president of marketing.

Derek Farmer has become product manager for ITT Business Systems 3800 series. He joined ITT Creed in 1984 as a management trainee and was group planning and DP operations manager with the management services division prior to his current appointment.

Mark Taylor and Paul Sellar have both joined Alacra as technical salesmen. Both have recently graduated.

DIARY

APRIL 16

Communications user forum. BCS Data Communications Specialist group. Grand Hotel, Birmingham. 09.30.

APRIL 16-17

IBM CUA forum. The Royal Bath Hotel, Bournemouth. Tel 01-551 1643.

APRIL 16

Should we be using word processing? London Chamber of Commerce and Industry. Cannon Street, London. 14.15.

Has the DPM a future role? and AGM. IDPM Central London branch. Pearl and Dean Studios, London. 18.00.

AGM. IDPM East Midlands branch. Derby College of Technology, Wilmorton, Derby. 19.30.

APRIL 23

The European Commission's Systran machine translation system. BCS Natural Language Translation Group. King's College, London. 18.00.

Towards a branch-and-bound algorithm for the one dimensional trim problem. BCS Mathematical Programming Study Group. London School of Economics, London. 18.30.

APRIL 23-24

The applications of process computers in the oil and gas industries. BCS Process control specialist group. Waldorf Hotel, London. 10.00.

APRIL 25

Participative design — a constructive appraisal. BCS Human Aspects of Computer Usage Specialist group. Bloomsbury Centre Hotel, London. 09.00.

APRIL 30-MAY 1

IBM CUA Series 1 group. IBM Havant and Royal Beach Hotel, Southsea. Tel 01-551 1643.

MAY 21

Interactive programming in Cobol on the IBM 8100. BCS Cobol Specialist Group. Polytechnic of Central London, London. 14.15.

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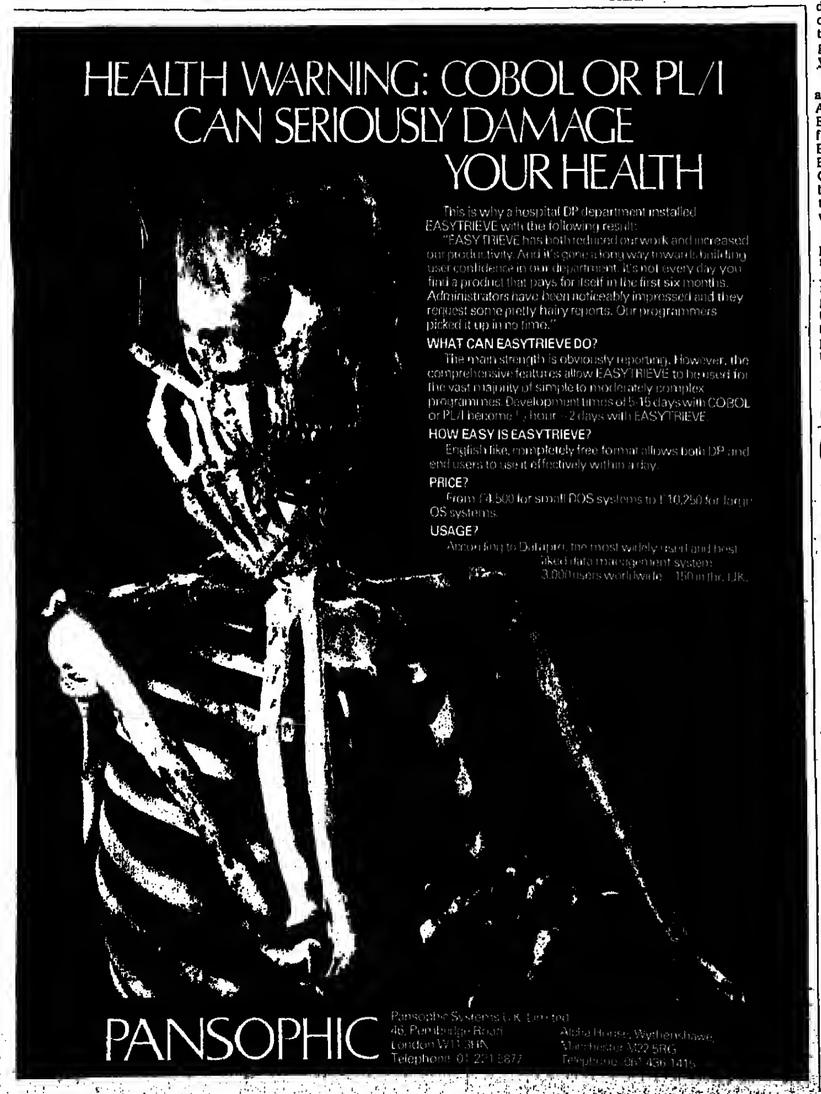

MICRO NEWS

by Eileen Stainer

Mainframe makers in personal market

GROWTH of the personal computer market over the next five years is likely to be rapid enough to entice mainframe manufacturers to enter the business (CW, January 3).

According to Thomas Burns, senior management consultant at SRI International, the market is expected to grow at a rate of 50% annually for the period 1980 to 1985. "By 1980, hardware expenditures in the field may exceed $2 billion a year," says Burns.

This has caused SRI International, the Croydon-based business research and consultancy firm, to undertake an eight-month multi-client study into the growth and characteristics of the US personal computer market over the next five years. The study is directed at mainframe computer and electronics manufacturers in Europe.

SRI has realised a need for management of businesses either already in, or planning to enter the personal computer industry, including manufacturers, suppliers, retailers and distributors. Clients have specifically asked for a broad and in-depth study of the current and projected markets for personal computers.

Entitled Personal Computers: Strategies for Success, the study is designed to help management plan its product line and identify future opportunities in the personal computer market. SRI considers that up to now management has had difficulty in keeping up to date with the market, technical innovations and customer preferences.

The study will analyse market size, projected growth rates and product characteristics and develop a success profile for each major market segment. This profile will account for competitive factors, government regulations, technological trends, changes in consumer values and other factors that may affect market characteristics and development.

Particular consideration will be given to the UK market. An evaluation is to be carried out on the personal computer product sales for the 1979 Christmas season, followed by a study on the attitudes and preferences of the buyers after having experience of their purchases.

SRI intends to discuss prime issues of the personal computer business and to answer certain topical questions. How should a company new to the industry find a fit? Will minicomputer manufacturers dip into the personal computer market by reducing price and capability? Will customer preference dictate that fixed program packages take most of the market, or will customers become increasingly involved in programming?

Findings of the study should assist company management to assess its present position in the personal computer business. Management should also be able to compare situation and market performance with that of the competition.

With regard to manufacturers which are considering entering the business, findings of the study should be able to tell them which area of the business they should be in, which market segments they should initially exploit and to what new developments they should be looking. Indications of where the crossover will come with the reduction in price of the minicomputer and the increase in price of microcomputers could emerge from the findings.

All these answers, however, will not be appearing until the end of the year when SRI hopes to have compiled a report. For a cost of $12,500, project sponsors will each receive five copies of the report and have access to SRI's consumer electronics experts. Late sponsors will receive the same for a fee of $14,500.

Applications for sponsorship should be made to Charles Mason of SRI International at 12/16 Addiscombe Road, Croydon. Tel. 01-686 5555.

9900 second source

A MOVE aimed at taking ITT Semiconductors into the high performance 16-bit microprocessor market is the winning by Intermetall, the company's world-wide semiconductor operation based in West Germany, of the second-sourcing rights to Texas Instruments' 9900 MOS family.

Apart from the TMS9900 4MHz 16-bit microprocessor, the family includes the TMS9940 single chip 16-bit microcomputer and the 9980A and 9981 microprocessors with 8-bit memory data buses.

The two-way agreement means that TI can produce in return ITT's series of advanced consumer and automotive integrated circuits in CMOS, PMOS and bipolar technologies.

Compelec support

SUPPORT for the Compelec microcomputer systems is to be provided by DDT Maintenance of Borehamwood, official service agent to Logitek. This arrangement has been set up by Logitek, the exclusive UK and Eire distributor of Altos devices, around which the Compelec systems are configured, to fill the gap left by the liquidation of Compelec.

This week EILEEN STAINER takes over as Micro News editor, having worked as a reporter on Electron for the past 18 months. In 1978 she graduated from Kingston Polytechnic with a sandwich degree in Electrical and Electronic Engineering.

Univac to produce custom-built VLSI

IN the new semiconductor division Univac is planning to establish at its existing site in Eagan, Minnesota (CW, March 20), the company will be using a $50 million investment to develop and manufacture specialist VLSI circuits.

Existing development of sub-nanosecond ECL and CMOS gate arrays for both commercial and military sides of Univac's business will be carried out on a much larger scale, with the bipolar and MOS laboratory becoming part of the new division.

Responsibilities of the division will include the process, development and fabrication of the company's custom designed semiconductors and any circuits required, in low-volume quantities only. The company stresses that it will not be producing standard components such as logic circuits, microprocessors and memory devices, which are available from external sources.

Included in the capital expansion plan is the construction of a new 145,000-square-foot facility at the existing 214-acre Univac Park office and laboratory complex in Eagan. The centre is due to be ready by 1982 and Univac expects that staff requirements will exceed 300.

Initially the new division will be using direct step-on-wafer manufacturing processes to allow design down to dimensions of two microns or less. However, installation of E-beam equipment is planned at a later date to achieve dimensions of one micron or less.

Univac expects to have devices produced by the new division appearing in about three years' time. This estimate depends on start-up problems being kept to a minimum using the latest photolithography equipment, computer controlled diffusion tubes and ion implanters.

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Experience of IBM 370/158's under OS/MVS and VS11 or Siemens Mainframes/Minis under BS1000 and 2000 is of prime importance in your application to this Multi-national Corporation, which has requirements for Systems and Applications Programmers, Designers and Analysts at several of their West German offices. Any TP/DBMS experience including CICS, IMS, TOTAL, ADABAS etc in commercial or technical fields will be especially welcome. An ability to communicate in German is highly advantageous, as liaison with the Company's clients may be one of your functions. The positions are permanent, so a genuine desire to relocate is essential. In addition to a high salary you will receive an annual holiday bonus and a wide range of fringe benefits.

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FURTHER APPOINTMENTS CONTINUED ON PAGE 20

First UK 4341 user hails its reliability

FIRST UK user of the IBM 4341, Sterling-Winthrop of Surbiton, reports the three-month-old machine has proved "extremely reliable".

Previously a DOS/VS user on a 370/145, Sterling-Winthrop is moving to DOS/VSE plus VM/370 and expanding from a completely in-house system to an SNA network of 3270 terminals.

"We had to move to DOS/VSE because we can't use the new 3370 disc drives without it," computer services director Ray Piggott told Computer Weekly.

"We were expecting our IPO/E (installation productivity option which facilitates the mounting of a new operating system on the 4300) in February and, in fact, we have only had it a couple of days.

"We did pick up a temporary version of DOS/VSE from IBM at Greenford, but we found it had several bugs in it, so that without the IPO it was not feasible to use it.

"At present we are running DOS/VS under VM/370, and we plan to use VM forever. We are developing an APL capability and VM provides a better APL personal computing service than the alternatives. We are also using VM/CMS for program development.

"It means that, for the first time, our systems programmers can do tests in an operating environment instead of waiting for night-time or weekends.

"We have some non-IBM software such as Logout and Spacemanager and we have had Macro 4 around here testing their DOS/VSE versions of these, too."

IBM's tardiness in delivering the DOS/VSE IPO/E has, so far, prevented Sterling-Winthrop from testing DOS/VSE alongside the production DOS/VS workload.

"It does not look as if conversion from DOS/VS to DOS/VSE will be much of a problem: VSE looks upward compatible but until we have had the IPO/E a little longer we won't know for sure."

Sterling-Winthrop is a diversified company in both proprietary and prescription medicines, do-it-yourself products, fine chemicals and industrial hygiene products.

Applications include order processing, general and sales ledger, sales statistics, company records, distribution, stock control, project control, customer inquiry and document retrieval. It is planned to have all applications online within three years.

The 4341 configuration includes two megabytes of main memory, a 3880 controller and seven 3370 disc drives. Sundry peripherals including nine Mamorex 6330 disc drives have been transferred from the 370/145. The 4341 is on lease from IBOS Leasing, which is part of the Bank of Scotland. It was acquired through computer brokers IBL.

Sterling-Winthrop, the first UK user of the IBM 4341 says it has been "extremely reliable". Here, the firm's computer serives director Ray Piggott shows group finance director Vic Underhill the video console of the system.

CII-HB launches world's first micro credit card

THE world's first micro-based credit card system, called CP 8, has been launched by CII-Honeywell Bull and consists of three elements: the card itself, a transaction recorder which writes to a memory module and a module reader for banks.

The microprocessor is thought to be a Mostek 3872 (CW, December 20, 1979) which is encapsulated into the card. It has a program memory and 4K-bits of EPROM memory and an interface links to eight contacts.

The card is the same size as a standard credit card, 3.4 x 2.2 inches, and is about one twentieth of an inch thick. The name and number of the card holder are embossed on it and, in the top left-hand corner, there is a circle divided into eight zones by black lines. These form the connections to the chip encapsulated in the card.

The bank supplies the client with a card with the EPROM already charged with money. During each transaction sum, the balance and the date of transaction are recorded in this EPROM, which is big enough to handle transactions. Once the money on it is exhausted, the card is thrown away; for security reasons it has been made non-rechargeable.

The card will be used in conjunction with retailers' terminals. Facing the customer is a keypad, strip display and slot. The customer puts the card in the slot and identifies it by keying in his secret number and another key causes the balance on the card to be displayed in the display facing the customer.

Finally there is a small statement printer on the customer side of the terminal.

On the salesperson's side, there is another keypad, another display, an alarm to indicate that something is amiss, and a memory module. The sum due is keyed in by the operator, and the sum and date are simultaneously recorded on the card and on the terminal memory.

There is no point holding up a shop for lack of modules: they are personalised to the shop and only readable by the bank which issued them.

Schlumberger, Philips Siemens, and SGS-ATES are working on similar systems (CW, February 7).

Cluff publishes first institute members' handbook

MORE than 50 articles on a wide range of computer oriented subjects are contained in the first annual members' reference book* from the Institute of Data Processing Management.

Nearly all the contents of the book comprise narrative which is presented in a neat but rather dull fashion. Areas covered include security and privacy, distributing computer power, improving computer performance, financing the installation, data communications.

*DP International 1980, the Institute of Data Processing Management members' reference book. 330 pp. £10 (free to members). Institute of Data Processing Management, 51/51 Goschen Buildings, 12/13 Henrietta Street, London, WC2E 8NU. Tel. 01-240 3304.

Microforum Europe to be merged with the IBS

MICROFORUM Europe is to be merged with the biennial International Business Show in the years that IBS is staged starting with the next IBS, which runs from October 20-29, 1981, at the National Exhibition Centre, near Birmingham. This development means that there will be no Microforum in the spring of next year.

The Business Equipment Trade Association, which organises both Microforum and IBS, is currently considering whether it should scrap Microforum altogether as a separate event or to stage the micrographics show once every two years.

Till now Microforum has been an annual show: this year's was held last month at the Wembley Conference Centre (CW, March 2t). The three-day event attracted about 4,000 visitors.

DP's nuts and bolts side goes on show

THE nuts and bolts side of the computer industry goes on show next week at the West Centre Hotel, Lillie Road, London, when Peripherals 80 opens its doors to professional purchasers of peripherals, terminals and add-on hardware.

Sponsored by Computer Weekly's sister publication, Systems International, Peripherals 80 runs from April 16 to 17 and is presented by the Peripheral Suppliers Association, the organisation that represents the collective interests of a line-up of independent firms which sell much of their kit on an OEM basis. One of the latest firms to join the PSA is Control Data, UK arm of the world's biggest supplier of OEM peripherals.

The majority of kit on show will be of US origin, underlining the fact that the UK suffers from a serious balance of payments deficit in peripheral equipment, in particular OEM kit. Exports of end user VDUs and other kit by IBM and one or two other mainframe suppliers probably account for the lion's share of UK peripheral exports.

Hardware either built by Digital Equipment itself or compatible with DEC based systems will be very much in evidence at the show and microcomputer systems builders should be interested in the 8-inch Winchester disc drives being exhibited on several stands.

Peripherals 80 is organised on behalf of the association by IPC Exhibitions.

CW helps to boost graduate recruitment

COMPUTER Weekly is aiming to boost the number of graduates entering the computer industry with a special graduate recruitment supplement, to be published on April 30.

The supplement will include articles by leading industry figures and by people who have come into the industry from university, polytechnic or college. It will be aimed at graduates of all disciplines.

The supplement will not be posted to people on Computer Weekly's normal circulation list but will be sent in bulk to careers officers at universities and colleges.

Training or careers officers at commercial colleges wishing to receive the supplement, contact Brian Durrant, Classified Advertising Manager, Computer Weekly, Dorset House, Stamford Street, London, SE1 9LU.

Lloyds adds 3033s

THE special relationship between Lloyds Bank and IBM has been further cemented with a £6 million order for two more IBM 3033 mainframes, each with the maximum 16 megabytes of main memory.

Similar name embarrasses consultancy

THE financial troubles of the UK software house HPAC (CW, March 13) are causing embarrassment at the software and microcomputing consultancy Hugh Pushman and Associates of Poole, Dorset.

"Because of the similarity between 'HPAC' and the initials of our name we've had many worried customers ringing up to say they've heard we're going out of business," said marketing manager Robin Wilkinson. "HPAC used to be a subsidiary of ours but we split two years ago. We're still growing and are profitable."

Robinson said Hugh Pushman was growing at 60% a year. Its turnover for its current financial year would be £750,000.

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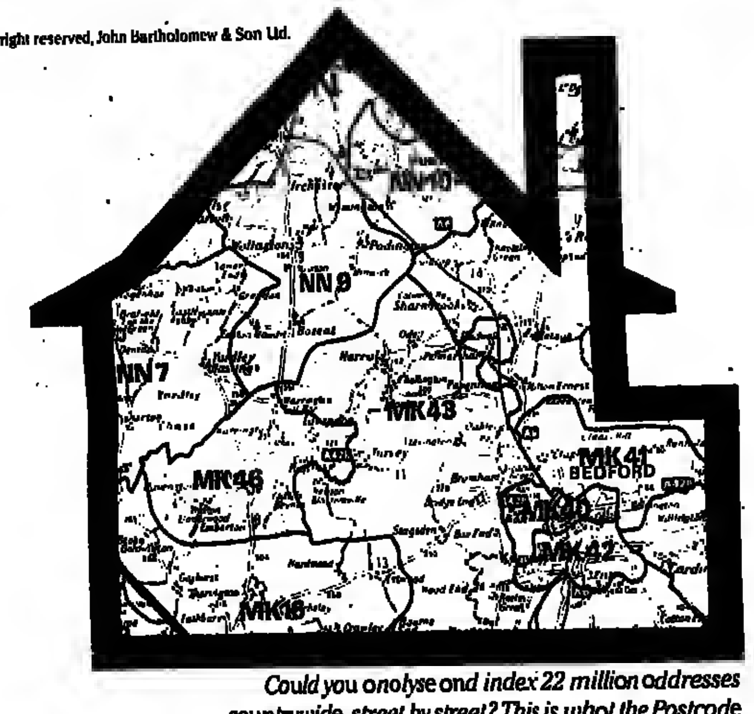

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HEAR MICHAEL JACKSON ON SYSTEM DESIGN

Significant advances have been made over the last decade in the field of program design. The ideas of Structured Programming are now accepted and the method developed by Michael Jackson has been particularly successful. Jackson Structured Programming (JSP) gives programmers a grip on the design task which most would not have conceived possible.

Although programming problems are now better understood, difficulties still face the designer at the system level. An ad hoc approach is only sometimes successful. There is no method for system design comparable to JSP for program design.

The ideas underlying JSP are equally applicable in the systems area. For some time it has been clear that an extension of JSP into system design was possible. Recent technical advances have turned the theoretical possibility of extension into a practical reality. Michael Jackson Systems Limited are presenting a two day tutorial on the technical advances and the system design method they lead to. The new ideas are known collectively as the Jackson System Development (JSD) method.

The first tutorial on JSD will be held in London on the 5th and 6th of June. The price will be £200 exclusive of VAT. Demand for this tutorial is expected to be high, so we advise you to book early to be sure of a place.

PLEASE NOTE: JSD (systems) builds on the ideas of JSP (programs). To understand the tutorial you will need a reasonable working knowledge of JSP. We have arranged a special three day workshop, immediately before the tutorial, for people not yet familiar with JSP. This workshop will cost £200 exclusive of VAT.

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Payroll changes after the Budget

The immediate and medium term implications of the Chancellor's Budget proposals are reviewed by CLIFF DILLOWAY. The immediate impact is routine but there are some significant changes on the way over the next two years. Relieving direct taxation on enterprise and imposing it on social security benefits has ramifications that will be seen in payroll by 1982.

ON the face of it the 1980 budget changes for payroll are simple, straightforward and routine.

Tax rates and bandwidths change in the usual way, and will not cause any hiccups or loss of sleep to payroll programmers. The details are in the notes on PAYE for computer users by the Inland Revenue.

Some of the fine detail in these notes is of a rather less routine nature, and the Chancellor's speech also contains mention of many changes to come.

There is for the first time an automatic (P7X) change to T suffix tax codes. This change does not affect the numeric part of the tax code, but requires all T suffix employees for whom a tax code change dated May 16 is not received from the tax office to be put on a week 1 basis. These employees might otherwise start paying excess tax due to the abolition of the 25% band from the tax table.

The requirement can probably best be met in practice by putting all T suffix tax coded employees on a week 1 basis programmatically and subsequently submitting the code changes dated May 16 to a separate update run.

An administrative change is also contemplated by the Inland Revenue. At present, an optional section in the specification for computer routines deals with the somewhat rare cases of rounding differences between the computer-produced figures and the manual tax tables. The Revenue is considering incorporating this optional section into the mainstream specification. Such a change will add to the size and complexity of PAYE computer routines and programmers will need to consider how they can best accommodate this change.

The Chancellor's other pronouncements all have a delayed action effect. Largely they are notices of intention and of proposed consultation.

Employers will have responsibility for making a minimum level of sickness payments to their employees during the early weeks of sickness from April 1982. No details have been published as yet on how the scheme would work, but a Green Paper is to come out shortly.

Presumably the employer's payments would be financed by a reduction of the National Insurance contribution. The prime intention of the scheme is to make sickness benefit taxable.

The same intention holds good for the taxation of unemployment benefit, but there is even less information on how the scheme might work. The Chancellor said: ". . . the claimant will neither receive refunds nor suffer deductions of tax until he is back at work." On the face of it, these words imply that the new employer will be responsible for adjusting the tax payments of all new employees who have been in receipt of unemployment benefit. The straightforward operation of the cumulative PAYE system would achieve this end, but program changes would be required to take account of the unemployment benefit taxed but not paid by the employer. There would also be an increase of "refunds not made" for leavers and at tax year end.

A similar recovery of tax by employers on account of social security benefits is implied in the decision to tax benefits paid to strikers' families. At the same time no income tax refunds are to be given to strikers until after the end of the strike, when, presumably, the paying of the accumulated amount of the refund will enable the employee to pay the tax on the benefits. There will be time for consultations on these proposals as the necessary legislation is not intended before the 1981 Finance Bill.

The proposal made last autumn that benefits in kind (particularly cars) should be taxed through PAYE has not been abandoned by the Government.

The Chancellor has singled out free petrol for private use in company cars as a target for taxation if the "provision continues to spread at anything like its present rate". He admits that such taxation would present severe administrative problems for employers and the Inland Revenue.

The Chancellor has taken steps to encourage wider share ownership among directors and employees. A constraint on obtaining the benefits is that the shares must be purchased by means of a special SAYE scheme that is being set up.

On the brighter side, there is a possibility that less tax year end information will be required by the DHSS with the discontinuance of earnings related benefits in January 1982. These benefits are based on National Insurance contributions reported for the previous tax year as stored in the DHSS computer. The possibility dims when it is realised that the NI contributions will have to be reported anyway, and so there is not much chance of a change to procedures.

The 1980 Budget is a portent of things to come. The Conservative government is now starting to take the steps set out in its election manifesto. For good or bad these affect the pay packet and payroll programs.

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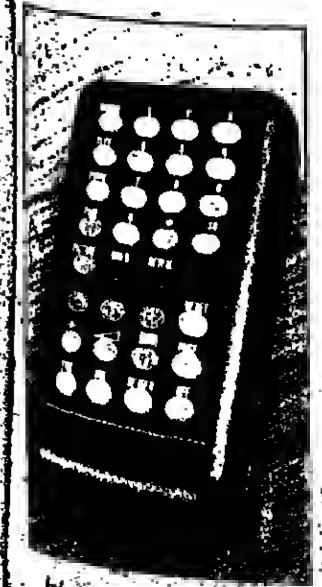

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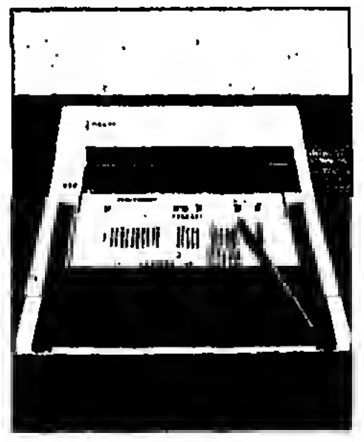

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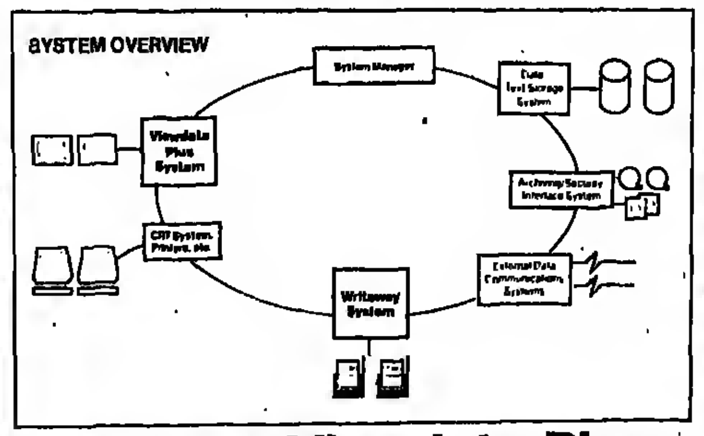

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IBM OS Cobol + Assembler programmer to commence April.	SURREY
IBM Conversion from **SYSTEM 3 to 34 RPG II** Programmer.	HANTS
IBM PL/1 + Cobol with CICS. Team Leader for new on-line development.	HANTS
IBM Cobol with TOTAL experience. Programmers for several locations start immediately.	LONDON MANCHESTER MIDLANDS
IBM 3031 Systems Analyst for 6 month contract.	DORSET
IBM OS Cobol with **CICS/DL1** Programmars for long term project.	YORKS
ICL Cobol + VME/B Analyst/Programmers.	BELGIUM
ICL COBOL VME/B + IDMS Programming. Expertise in this field is required for various projects in several locations in the UK and Overseas.	LONDON YORKSHIRE MIDDLE EAST
HONEYWELL Level 64 Major Commercial project starting soon, requires COBOL programmers with on-lina experiance.	N. LONDON
HONEYWELL Leval 66 Cobol programmers required for conversion project.	HOLLAND
NIXDORF OR HONEYWELL Cobol programmers.	HOLLAND
UNIVAC 1182 under **EXEC 8** programming work in Assembler.	LANCS
PASCAL programmers to work on **APPLE/ITT 2020.**	W. LONDON

These represent just some of the Contract Opportunities available. If you are looking for your next contract, on one months notice, or interested in entering the contract market for the first time, then speak to Richard Kaluzynski, Denise Fleming or Colin Cherry now.

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01-491 4706

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* Data communications protocols experience

As part of one of Britain's most successful private organisations our client is the unchallenged leader in its field and is committed to extensive ongoing development in order to retain this enviable position. For the successful candidates, therefore, the rewards are high, including: excellent starting salaries, relocation expenses where appropriate, five weeks' annual leave, comprehensive pension and life assurance, real opportunities for progression and career development, and a salary review in June.

Ref: SW2/1104

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Currently all their Salesforce is Exceeding Objectives and to maintain their growth rate in the U.K. they need to make further investment in PEOPLE . . . YOU!
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PLUS:—One of the Finest Sales/Product Training Schemes Available in the Industry Today!

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1 15 2 7 10 3 6

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U.C.C. Software Products International provides a range of operating software products which are used by more than 2000 IBM users worldwide. The products include:

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(1) **U.C.C. 1** - Tape Management System which interfaces with the UCC 15 Job Recovery Management System.

(3) **U.C.C. 3** - Disc Management System which highlights DASD problem areas and helps correct them.

Full OS and MVS operating system and U.C.C. product training will be given, both by formal courses and on the job training. At least 1 year IBM ASSEMBLER experience is required preferably with OS/JCL gained in an OS environment.

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Please telephone (24 hour answer service) or write to apply Quote Ref: CW119-J (467)

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01-686 9693 AMP House, Dingwall Road, CROYDON CR9 2AU

THE POLYTECHNIC: WOLVERHAMPTON

The Computer Centre is being established as a separate service following the recent installation of a dual PRIME 500 computer system.
Applications are invited from men and women for the posts of:

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Applicants should have substantial experience of the computing requirements in an educational, industrial or commercial environment and will be expected to lead the development of the Computer Centre.
Salary £10,381-£10,959 (under review).

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To be responsible for all systems [illegible]
Salary £6,038-£7,704 (under review).
Further details and application forms [illegible]

BRUNEL UNIVERSITY
Computing Unit

The Computing Unit invites applications from experienced graduates and/or professionally qualified personnel for

COMPUTING OFFICER POSTS

There are requirements in the areas of:—
Documentation Control and Software Quality Assurance
Systems Programming
Applications Programming

The University will be replacing its current equipment during the summer vacation and training will be given on the new systems.
The Computer Officer posts are on the Grade 1A scale £4402-£6789 plus £740 London Allowance.
Write for application form and further details to the Establishment Secretary, Brunel University, Uxbridge, Middlesex UB8 3PH or telephone Uxbridge 37188 extension 48. Closing date 30 April, 1980.

CITY OF BIRMINGHAM POLYTECHNIC
FACULTY OF ENGINEERING AND SCIENCE

MICROPROCESSOR APPLICATIONS RESEARCH ASSISTANT

The successful candidate, who should have a degree or relevant professional qualification in Engineering or one of the Applied Sciences, will join an interdepartmental research team. He/she will be encouraged to register for a higher degree and will be expected to undertake some teaching. The appointment will be for 2 years.

SALARY SCALE: LECTURER 1: £3768-£6436

Further details and application form (to be returned by 25th April, 1980) from: The Personnel Officer, City of Birmingham Polytechnic, R Block, Perry Barr, Birmingham B42 2SU (021-356 6911 Ext. 217). (457)

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Prime are in the forefront of product development in the fields of networking, Communications, Transaction Processing and High-density Media.

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c. £8,750
3-6 years experience.

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c. £6,500
1-3 years experience.

These are all first rate opportunities for those who have experience of mini or main frame systems software and want rapid career advancement in a really good environment.

Salary scales go much higher than the average quoted. Free BUPA, a generous relocation package, Pension Scheme, free Life Assurance and preferential company stock purchase are all part of our comprehensive package.

Telephone Debbie Teague on 0234-65121
or write to her at Prime Computer, Research and Development, The Merton Centre, St Peters St., Bedford MK40 2PN.

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ADVANCED DEVELOPMENT MANAGER

BERKSHIRE **Start circa £10,750**

This position is an ideal opportunity for a skilled Senior Systems Engineer to accept the challenge of managing a team dedicated to the investigation and evaluation of new sophisticated technologies related to Data Communications.

The person appointed will need to be able to offer significant expertise in either DIGITAL NETWORKING or MAINFRAME COMMUNICATIONS. Additionally a proven background in MICRO-PROCESSOR TECHNOLOGY is essential since micros will continue to play an ever increasing role in new transmission systems. The successful candidate will need to be aware of general developments at the forefront of component and systems technology and will therefore attend conferences and exhibitions on the company's behalf, as well as paying occasional visits to the U.S. in order to keep up to date with progress there.

This is a senior position within the company carrying a high commencing salary. Additionally free BUPA cover, an excellent pension scheme with free life assurance, five weeks' annual leave and comprehensive relocation expenses, where applicable, ensure an attractive remuneration package.

Ref: SW1/1004

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ICL 2900 VME8 Cobol ANALYST	LONDON
IBM DOS/VS CICS/VS OLI SYSTEMS PROGRAMMER	MIDDLE EAST
System 34 RPGII ANALYST PROGRAMMER	SURREY
Terminal Access Cobol PROGRAMMERS & ANALYSTS	LONDON
IBM DOS PLI Database PROJECT LEADER	FRANCE
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A major systems company situated in picturesque surroundings in North Carolina have requested us to supply a number of professionals on a twelve month assignment basis.

Univac Systems Programmers

A thorough knowledge of operating systems Internals on either Univac 1110 or Univac 1182 machines is essential. Familiarity with datacommunication processors CSP or DSP will be advantageous.

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A minimum of one year's OS/MVS (Internals) experience gained on one of the following machines is essential:- 370/168, 303X or Amdahl V7. Successful candidates will be familiar with TSO and TCAM or equivalent.

Earnings packages will be in the range of $26k-$32k per annum with a considerable tax advantage.

Initial interviews will be held in London, Birmingham and Manchester during April.

Please contact Cathy Walsh on 240 2441
for further information

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Salary to £8,000 + Car + Allowance

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NORTH WEST THAMES REGIONAL HEALTH AUTHORITY
COMPUTER CENTRE

SENIOR SYSTEMS DESIGNER
(TEAM LEADER) — 2 POSTS

SALARY SCALE £7430-£8949 INCL. LONDON WEIGHTING

The Authority wishes to appoint two systems analysts with managerial ability and experience to lead teams of analysts and programmers. One team is responsible for all Accounting systems, the other for providing an information service to Personnel, Manpower Planning and Management Accounts Users in the Region. Database experience, although desirable, is not essential as appropriate training will be given.

The Regional Computer Centre is a modern purpose-built self-contained unit standing in its own grounds in Colney Hatch Lane, New Southgate, London N11. The Centre is equipped with a large ICL 1904S supported by document readers, Redifon key to disc systems and NCR microfiche processor. COBOL has been adopted as the installation standard language. In addition a wide variety of mini computers are installed around the Region. There are good working conditions, a 36 hour week, 23 days annual leave plus 2 days additional to the usual Public Holidays, and canteen facilities.

Further details and application form may be obtained quoting ref. no. 818/CW, from the Regional Personnel Officer, North West Thames Regional Health Authority, 40 Eastbourne Terrace, Paddington, London W2 3QR (Telephone No. 01-262 8011 Ext. 261). Closing date 28th April, 1980.

(460)

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We are looking particularly for people with experience in these fields:

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COMMODORE BUSINESS MACHINES (UK) LTD.
818 LEIGH ROAD, SLOUGH, BERKS.

(515)

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U.T.R. SYSTEMS LTD.
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(478)

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We are seeking a senior computer professional with experience of both project control and man-management, related to business applications, preferably within a computer services organisation and ideally related to timesharing facilities.

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The job is located in CENTRAL LONDON and the company expects to pay an income package of

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To work in project teams — minimum of 2 years' experience — salaries dependant upon this experience and ability.

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The Company require candidates with proven expertise in Cobol, however, experience of other commercial applications languages may also be of interest. Salary levels will be determined by length of experience gained.

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For further information, and to arrange a location interview, telephone DAVID HICKS on 031-225 2711 or 031-226 5969, or write enclosing a detailed CV to:
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Please quote reference number CP/82/E

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DML

ANALYST/PROGRAMMER

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The Regional Personnel Manager, Central Electricity Generating Board, North Eastern Region, Bockwith Knowle, Otley Road, Harrogate, HG3 1PS, quoting ref: SVN/113/EMT/CW. Applications should arrive not later than Friday 18 April 1980. Telephone (0423) 702657.

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£10,000+

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The post calls for a person with proven experience in creative management in data processing, who is prepared to spend long periods in different parts of the UK. The salary is negotiable and will reflect the calibre of the post. A car will be provided.

This appointment is open to both male and female candidates who should send adequate particulars initially, in confidence, to Mr. P. R. Billinghurst at:

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(476)

JBA

MVS Systems Programmers

S. Germany **£24,000 – £29,000**

Our client is a German systems house which is currently expanding its operations in the large systems software market.
Candidates with over 3 years experience of maintaining large IBM operating systems – including MVS – will be considered for either permanent or fixed-term employment. Knowledge of the German language is not essential.
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Contact: Andy Wright

Micro – Software Sales

London Based **Earnings c. £18,000+ (+ CAR etc.)**

Our client is beginning to acquire an outstanding reputation throughout the commercial d.p. world for the innovativeness and flair of its software products. Their aim has been to make the micro easy and flexible to use in an interactive commercial environment – and there is no doubt that they have succeeded.
Opportunities exist in the company's Sales and Marketing team for professional, successful sales personnel who can sell worldwide. At present, the vast majority of their sales are made to the USA and Europe and the directors wish to see this trend continue – experience of working in non-UK markets is therefore particularly welcome.

Contact: Andy Wright

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A small, specialist Dutch company has several requirements for experienced database Designers and Analysts to work on new, advanced development projects. Duties will range from corporate systems strategy studies, through to technical design and project management so obviously candidates must have at least 7-10 years d.p. experience in all.
Foremost technical expertise must be a database design – e.g. DMS90/1100, IDMS, IDSII, DMIV etc. and should include sound T.P. and on-line systems design.
Applicants without project or team management experience are acceptable but will be expected to possess extremely good technical knowledge.

Contact: Andy Wright

Bureau Sales

West Yorks **Earnings of c. £10,000 + Car**

A large organisation offering a comprehensive range of bureau services, on main frames and micro computers, requires an additional person to join an established sales team.
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Contact: Bev Stevens

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A multi-national engineering company is seeking a Project Manager to be responsible for design, development and implementation of a new "worldwide" engineering system. The system will utilize database, and communications technology and the work will involve international travel.
Applicants should be computer professionals with the ability to manage people and projects. A background in engineering systems and IBM main frame experience is preferable.
A stimulating project opportunity with excellent scope for future development.

Contact: Bev Stevens

JAMES BAKER ASSOCIATES,
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Tel: 01-439 9311.

(521)

ADVANCED TECHNOLOGY — DOS/VSE — State of the Art

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(354)

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THE COMPANY—A large multi-national Organisation and one of the world's leading manufacturers of computers and peripheral equipment, specialising in distributed data processing techniques.

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REF: CW/0304

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(493)

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Application forms and job specification may be obtained from and should be returned to the Principal Administrative Officer, Gwent College of Higher Education, College Crescent, Caerleon, Newport, Gwent, NP6 1XJ within fourteen days of the date of advertisement. (508)

THE SALES BIT

Make sure the customer can afford his order

EARLY in my sales career I was employed as a mainframe computer salesman with IBM in the Midlands, selling to the manufacturing industry.

One of my first major sales involved a firm whose primary problem was the need of a system to give it more effective control over accounting and warehouse stock.

My negotiations with the managing director were progressing nicely and, during the course of conversation, I also introduced areas of my employer's expertise related to production, engineering and scientific applications.

Much to my satisfaction the MD reacted very positively and said it would be a good idea if our feasibility study also took account of whatever requirements also existed in those areas.

So, off I went. The technical director was very enthusiastic and described to me a wide range of, what were at that time, totally incomprehensible applications where computers could make a considerable contribution to the efficiency of their design and analysis activities. Structural analysis and design, statistics — I was very impressed.

I was even more impressed having spoken to some of their engineering management. Their cumulative potential requirements were very significant indeed!

I then met the production director who told me about his plans for a production control system which he intended to integrate with whatever stock control system was put into operation. Machine shop scheduling, bill of materials processing — I found the potential somewhat overwhelming.

I could hardly believe my luck. What I had been told by my sales manager was a good prospect for a medium-scale accounting system was in reality an excellent prospect for an integrated large scale computer complex.

One of the crucial aspects of proposing a computer system is designing or configuring a particular permutation of devices which will be able to handle the immediate workload and the estimated requirements over a given timescale.

I could hardly believe the size of computer needed to handle the total workload.

I had one of my colleagues check it out and, other than slightly modifying the configuration, he was in agreement with my specification and costing.

So that was that. I then proceeded to compile the facts in a formal sales proposal ready for the final presentation.

Fortunately, as a standard procedure, I was obliged to present the proposal to my sales manager first. It went pretty well and I felt a small glow of pleasure as I saw a look of incredulity creep over his face.

"Now he can see what a brilliant salesman I am," I thought. "I've managed to expand this prospect far beyond what he thought was possible." I was right!

"Hang on a bit," he said as I meandered through the data storage implications of "parts explosion". "How much is all this lot going to cost?"

I resisted the temptation to say "But I haven't finished yet" and gave him what I thought was a very impressive total figure.

"You idiot!" he said. I experienced total confusion. "What makes you think they'll pay that kind of money?" I explained the tremendous enthusiasm of the various members of the prospect's senior management and how the managing director had been most encouraging.

My manager was not impressed. "Did you ask them about the size of their budget?" No, I hadn't — "Or let them know how the configuration and therefore the cost was growing as the feasibility study progressed?" No, I didn't think it necessary.

Feasibility studies, Part 1

I won't bore you with the ensuing barrage of questions, each of which made my stupidity more apparent. As it happened, the outcome was not as disastrous as it might have been.

My manager had taken the precaution of discovering the maximum amount the client was prepared to pay, which must have been about £100,000. My euphoric solution was nearer half a million!

As a result of this object lesson, I was able drastically to rationalise the system and deliver a proposal that was somewhat more appropriate.

Thank goodness for a perceptive sales manager. At least the "egg-on-my-face" was limited to my own department rather than the client's board room.

TRADER

Scots branch

INDEPENDENT supplier of minicomputer disc systems, System Industries (Europe), of Woking, Surrey, has opened a Scottish support and maintenance office. The new facility is located at the Edinburgh Regional Computing Centre, Mayfield Road, Edinburgh 9.

Microdata agent

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Puzzle Answer

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TH/77/CW10/4

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(510)

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The positions are open to both men and women. All assignments are on single status but married personnel will receive return leave every four months. The location is in the eastern province of Saudi Arabia approximately 15 K.M. from the Gulf States.

To find out more and register your application telephone 01-242 9366 and ask for Mike Mead or ring 01-807 7425 (evenings or weekends). Alternatively, write to OCC Computer Personnel, 16 Bedford Row, London WC1R 4EB quoting reference 915/CW/MM.

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Computing Services Association